THE

JOURNAL OF GAS LIGHTING.

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XVI. No. 379—19th YEAR.] LONDON, APRIL 30, 1867. [Subscription per Ann. { 15s. in Advance / 18s. Credit.] TREBLE No. 1s. 4d. Unstamped.

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1862.

CLASSES X. & XXXI.

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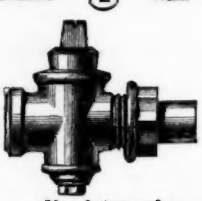

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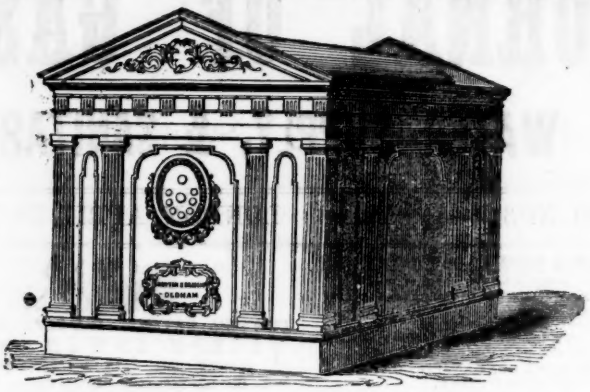

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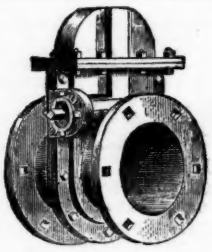

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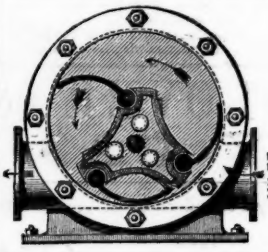

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☞ *See "Practical Mechanic's Journal," Dec.* 1, 1865; *also, p.* 711 "JOURNAL OF GAS LIGHTING," *Sept.* 18, 1866.

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It is worthy of remark, that the only two other Firms who receive Awards *both manufacture imitations of Thomas Glover's* Patent Dry Gas-Meter, and the reason given for these Awards is *"construction* and sound workmanship." Thomas Glover, therefore, claims that the *construction* of his Meter has obtained *three Awards from the Jury of the International Exhibition of* 1862; at the same time, *contrasting* the Award granted for his Meter by the words, *"For excellence of manufacture, as regards Dry-Meters."*

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All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

ERRATUM.

In the report of Mr. Gray's remarks at the deputation to the Board of Trade (JOURNAL April 16, p. 279) *for* "£160,000" *read* "£1,600,000," as the extent of the depreciation in the value of gas property.

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, APRIL 30, 1867.

Notes upon Passing Events.

THE Great Fair of Paris is beginning to settle into something like order. The most important shops are open, and the retail shopkeepers are doing a good deal of business. We hear of large sales of glass and porcelain, of the ornaments of drawing-rooms, and the boudoir. We hear of an English tailor who has taken a great many orders for shooting-jackets and other devices of British invention. We see that a great deal of money must perforce be expended in Paris—by the exhibitors on workmen, by visitors on all manner of necessary and unnecessary payments and purchases; but in the midst of the blue fire and Bengal lights burned by the descriptive press, we do not see what substantial benefit is to be rendered to art, science, or manufactures by this great gathering of fancy articles and advertising tradesmen. All the enthusiasm of early exhibitions has been expended, and nothing remains but a great advertising bazaar, arranged, the managers say, and it is not worth while to dispute with them on scientific principles. One certain result of the undertaking will be to make any more universal exhibitions impossible during the life of the present generation. The exhibitors at whose expense this gigantic temple of puffery has been erected, must die off, and be replaced by a new race, flushed with the sanguine temperament of inexperience, before manufacturers of established reputation will again sink thousands of pounds in imitating the systems of Messrs. Moses and Professor Holloway. Two favourite fixed ideas with regard to the French will be completely exploded by the Paris Exhibition. Their character as excellent administrators is for ever gone. They may do well in old-established institutions, where they work with officials trained to military obedience; but as a specimen of arrangements ruined by impossible regulations, the French Exhibition will long be famous. Frenchmen are not allowed to grumble in public, and have, therefore, neither the habit nor the opportunity of writing letters of complaint to newspapers. Officials in all countries never admit they are in the wrong, and, therefore, everything appears to work more smoothly than in England; thus the machinery gets the credit. But our exhibitors are not so patient as the natives; our reporters are paid to report, so we know how the Exhibition has been mismanaged, and may form a good guess at the working of other establishments into which the prying foreigner is not admitted. Then, again, we ought to hear no more of the shop-keeping character of the Englishman as compared with the Frenchman. At this Exhibition, Pitt has been outdone as a taxing financier by Le Play; if the exhibitors and visitors do not pay for the air they breathe, it is only because no means has been found of measuring the dusty fluid. Some writer in periodicals of *All the Year Round* character will probably find, before the year is out, a subject for a truly comic article in the adventures of an exhibitor in pursuit of a prize medal at the Paris Exhibition.

The reporter of the *Times*—the only reporter who does not seem to give himself up to puffing particular tradesmen—has found out what exhibitors at all shows have discovered long ago—viz., that the reports of juries are a farce. The reasons why are many, but obvious. For instance, nine-tenths of the articles exhibited cannot be tried under circumstances that will convey any idea of real merit. It is difficult to ascertain whether the elements of cheapness or durability exist; impossible to find out whether "the exhibit" is an average production at an average price, or a show article made to win a prize medal, and be the foundation of an advertisement. For instance, Sheffield has a deserved reputation for cutlery, and Paris for tasteful jewellery; but there is nothing to prevent a London jeweller from engaging foreign designers and workmen, or a French cutler from sending for Sheffield journeymen, at fabulous wages, to make one case for the Exhibition. And this is largely done. The shrewd or silly, according to their trades, invest a sum of money in sensation articles for exhibition, and if they can impose on the jury, they trust to be able to impose on their future customers. As for the visitors, their troubles and taxes, down to the *carte de visite* tickets, are indeed legion. They are handed over, from the moment of their arrival in Paris, to harpies, whom it would be flattery to compare to the male and female friends of Abraham Brown, the sailor, after a long cruise, and pockets full of pay and prize-money. Whether they suffer most from the absence of chairs in the Exhibition, or the absence of cabs outside, is still a moot question.

The latest news, that gold medalists of former years, if again successful, are to be content with a certificate, will strike dismay into many hopeful hearts. Surely this last stroke of economy will give the finishing touch of ridicule to the prize system invented in France. We commend the example to the notice of those agricultural societies which give heavy prizes. Instead of debarring a bull from winning

two years in succession, let them provide for such fortunate exceptions a paper gilt medal.

There is a French lithograph of an army before the Revolution marching through a flooded country in cocked hats and pigtails, with this explanatory sentence—the order of the officer in command—"You may not smoke, but you may sit "down." Visitors at the Paris Exhibition may not smoke or sit down in the building, or outside, without extra payment. Still the affair will answer the purpose of its founder. It will pour millions into the lap of Paris, and confirm the French in their opinion that they are superior in everything to all the rest of the world. If it would only induce them not to envy the Prussians, the world might be at peace. In the just published number of the *Revue Contemporaine*, M. Alphonse de Calonne has a long article on the Exhibition, in which he gives the credit of the design for the building to two Englishmen—Messrs. Maw and Payne—who in 1861 sent a sketch of this hideous production to the Emperor, and afterwards published it in the *Builder*. "But," says M. de Calonne, "up to the pre-"sent time the Imperial Commission have not given credit to "the designers of the plan they have borrowed." For our own part, admitting that the plan of the building is ingenious on paper, we should prefer the simpler rough and ready scheme of 1851, if we could only revive the enthusiasm of that never-to-be-forgotten show. M. de Calonne says: "The English "showed their superiority over us in their Crystal Palace "(of 1851). They created a really original work, not want-"ing in beauty, because there was no attempt to disguise the "materials of which it was composed. A few colours com-"pleted the decoration. On this occasion (1867), being "allowed to exercise their own taste in decorating the sec-"tion of the building which had been allotted them, they "have avoided the fault committed in the French part of the "building, of erecting an edifice within an edifice, and instead "of hiding the iron pillars and girders with planks, and con-"structing temples of cardboard, they have painted them "a green olive colour, and ornamented them with the "monogram of their sovereign in gold. The result is that, "with less expense, the English have produced a practical "and yet a more grandiose effect. You feel the different "characters of the two people when you suddenly pass from "the English to the French quarter. In the latter, every effort "possible is made to hide the nature of the building; the "pillars are covered with calico; in fact, there is an excess of "decoration, which reaches its apogee in the painted paper "palm-trees of the Algerian department." Really we have heard so often and so long of our bad taste, that it is a comfort to find, from such an authority, that we can succeed when we do not attempt to be graceful or artistic.

The publication of the evidence before the Commission on Trades Unions is beginning to have an effect on public opinion, which it is to be hoped will eventually filter down until it reaches the classes who are now bent on reintroducing the exclusive systems of the guilds of the middle ages. It may be remembered that in 1848 one of the first uses the population made of their power in Paris and in Berlin was to call for all manner of restrictions on labour. Foreign workmen, not English only, but of all countries, were chased from France, and in Berlin the bakers protested against the infringements of the pastrycooks, or *vice versâ*. We are now suffering from the reaction of feeling after centuries in which the workmen sought employment and received it as a favour, just as agricultural labourers in certain English counties do still live in chronic pauperism. There was a time when it was as dangerous for a workman to ask for more wages as for Oliver Twist to ask for more gruel. The strikes of those days were not for high wages, but for existence The consequence is that the working mechanic still has, with romantic souls like Mr. Hughes and Mr. Frederick Harrison, an amount of sympathy due to a previous state of existence. Before the commission closes its labours the thinking reading world will learn that to grant to trades unions the additional legislative powers they claim, will be to decree that in production there shall be only employers of such wealth that they can either produce or live on their invested capital as they prefer. All small employers must disappear; all cases of foremen growing into masters will be stories of the past. According to the principles of trades unions, as at present represented by the engineers, the carpenters, the stonemasons, and the bricklayers, no man is to judge what wages will suit him and his family. He must obtain the wages, and no less—do no more than so much work, with such fellow-workmen, and for such masters as the central committee of his society approves, at the risk, if he disobeys their orders, of being "sent to Coventry," insulted, and tormented until his life is made a burden to him. No laws likely to be enacted in this country can touch this organization, while working men enjoying the benefits of free trade in foreign importations sympathize with a system of protection which will make manufactured articles artificially dear at home. The building trade offers one of the best examples of the effect of what Messrs. Odgers and Cremer justly call the war between labour and capital. A builder, to carry on operations on a large scale, must have a certain amount of capital sunk in ways which are only profitable when employed. If he is a great capitalist, he wishes to give employment to his fixed staff of foremen and clerks, horses and machinery. If he is in a small way, he wants to earn something better than foreman's wages for himself and his sons, and to turn to account the use of the little daughter who keeps his books. He has also, whether great or little, to compete with other employers for work and for labour. When capital is plentiful and trade is flourishing—when masters are competing for men—wages rise easily and rapidly, and the joint machinery of capital and labour adjust themselves. But it is when, as at present, trade is slack, that the iron despotism of trades unions is felt. Sooner than be idle, or let his capital be idle, the builder is ready to do work at a small profit. He finds mechanics willing to work for him at wages perhaps a little lower than in good times; it suits both parties to do a certain amount of piece-work; and so a considerable number of men, who have been unwillingly idle for weeks or months, are set to work at wages that bring comfort and plenty to their kitchen fires and cupboards, and all goes "merry as a marriage bell. But down comes a diplomatic agent from one of the central committee and says, with the quack in "Joe Miller"—"Hallo, you eat well, drink well, and sleep well: this can't be right—I must alter all this. You are getting an halfpenny an hour less than any man ought to get, and then there are five or six men doing piece-work, and earning too much money," &c.; and thus men willing to work are not allowed to make their own bargains. This is not an imaginary case—the country swarms with such cases; they are throwing all work into the hands of a few great capitalists, who take contracts with a strike clause. If the system could be worked out, the many who live in houses and wear clothes would have to pay extravagant rents and prices for the benefit of a minority of skilled mechanics and their officers living in London. It took a long time to teach the working classes of England the universal benefits of free trade; alone, they never would have carried the repeal of the taxes on consumption. It will take many years to teach those who live by their hands that they lose, as a body, by trade rules for protecting the idle and the dull.

The tailors are again on strike, this time rather for power than money. Tailors reject weekly wages, and insist on piece-work. We must wait, and let working men find out what is good for them. It is a pity the tailors do not try the co-operative system on a great scale. If any class of workmen ought to succeed in such an attempt, they ought; and if they do not try, the world will think hardly of their honesty and their prudence. To ask for more wages is their right; to hunt down men content with the present rate is to illustrate the tyranny of mob law.

An article published the other day, by Mr. Charles Rossiquet, gives a financial history of the French railway system down to 1857, which will be new and interesting to many of our readers. The first railway, or rather tramway, in France, of only 18 kilomètres in length, was authorized, by a decree of Louis XVIII., for the use of some iron-works, opened in 1830, and worked by horses and bullocks. The first time a locomotive was used was in 1832, on a railroad between St. Etienne and Lyons. The Revolution of 1830 for some time checked further enterprise. In 1833, Messrs. Talabot, eminent engineers, well known in England, obtained a concession of a railroad 71 kilomètres in length, between Alais and Beaucaire. In 1835 the railroad from Paris to St. Germain was authorized by the Chambers of Legislation. In 1836 other insignificant lines, including the two on both banks of the river to Versailles, were sanctioned. In 1837, Count Molé, then Prime Minister, applied to the Chambers for powers to concede to companies, with or without subventions, a large group of lines, including Paris and Orleans, Paris and Rouen, Lyons and Marseilles and Paris, to the frontier of Belgium. The French

Minister proposed to grant these lines to companies for a term of 99 years. A discussion ensued, which ended in the rejection of all the projects for the grand trunk lines, and the granting of some short lines only. In 1838 the Ministers again brought forward a plan, based on the report of a special commission for a complete series of grand trunk roads, to be executed by the State. But again the Chamber rejected the official plan in its completeness. However, four separate concessions were passed, the most important of which were from Paris to Rouen, Havre, and Dieppe; from Strasburg to Bâle, and from Lille to Dunkerque. Between 1839 and 1842 politics absorbed too much attention to leave much room for social and economical questions, and the consideration of a great national network of railways was adjourned, but a few more detached bits were sanctioned. In 1839 railway enterprize was very much depressed, shareholders could not pay their calls, several railway concessions were cancelled, and others had to abridge the length of the original undertakings. In 1840 the first guarantee of interest to any railway was conceded to the Orleans Company, and another railway to Strasburg obtained a loan. In 1841 not a single line was authorized. Up to 1842 the State had spent 800,000 francs in an inquiry into the best plan for the main trunk lines. The Chambers had voted loans of about £1,600,000 sterling to five companies. The Orleans Company had had interest guaranteed on its capital of about £800,000, and a credit of not quite a million sterling had been voted for the execution of lines from Lille to Valenciennes, and from Montpellier to Nismes. Thus during the ten years that the French were writing newspaper articles, pamphlets, and books, and delivering long harangues from the Tribune on the principles of railway legislation, England, Belgium, Germany, and America, had constructed more than 8000 kilomètres of working lines. In 1842 a scheme for a complete network of railways, proposed by M. Guizot's cabinet, was adopted, after long discussion in both Chambers. The following was the mode of execution:—The State undertook to pay one-third of the cost of the land, and of all the buildings required for the lines, and also to pay all the cost of earthworks, and works connected with the permanent way, and of the stations. The departments traversed paid two-thirds of the purchase-money of the land and buildings, but the State lent them the needful funds. The companies were to take a lease of the work so executed, lay down the rails, and find the rolling-stock, and be repaid the value of same at the end of each lease. To carry out this scheme 126 millions of francs were voted. Not much was done in new concessions in 1843; but in 1844-5 railway extension was pushed on vigorously. In 1845 an Act regulating the management of railways was passed, which, although not altogether foolish, would have driven the travellers and railway officials of England wild, and made trade almost impossible. In 1847 the French railway companies were seriously embarrassed by the commercial crisis. Some concessions were given up in consequence of shareholders being unable to pay their calls. Then followed the Revolution of 1848, which still more seriously embarrassed all the railway companies. The Republican Government was obliged to publish a decree declaring that railways were under the protection of the State. Advanced Liberals had shown their fraternity by burning railway stations, breaking down bridges, and tearing up rails. The companies were for the most part insolvent, because their funds were invested in Government paper, which was valueless. The Republican Government made short work of the difficulty, and sequestered the railroad from Paris to Orleans, placing it "under the charge of Citizen "Savage, mining engineer." The Minister of Finance next brought forward a proposal for taking possession of all the railroads belonging to private companies. The value of the shares was to be settled at their average price during the six months previous to the Revolution in February, and the shareholders were to be paid in Government stock at 5 per cent. But the plan met no favour in the Assembly, and was never seriously discussed. The Paris and Lyons Company being unable to perform its engagements, was purchased by the State. Other railways, less fortunate, were sequestrated. In 1850 a law authorized the State to advance two-thirds the value of railway shares or bonds to shareholders. A new era opened for railroad enterprise after the *coup d'état* of 1851. The Chief of the State was authorized to decree any concessions for public works to any persons only applying to the legislative chambers, where a subvention from the State was required. The result was a remarkable activity in railway enterprise. In 1854 and 1855 the financial difficulties of the railway companies began to appear; only about half of the concessions granted were completed and at work. After 1855 the Government thought it wise to check further investment in railway speculations. In 1856 the French network of railroads had cost about 123 millions sterling, of which the Government had contributed not quite 25 millions. 1857 was remarkable for the steps taken by the Government to promote amalgamations. In this year the number of great companies was reduced from eleven to eight. At the close of the same year, the railway companies were obliged to apply to the Government for assistance, and it was arranged that the interest on the unprofitable branch lines they had undertaken should be guaranteed by the State, and that, in some instances, assistance should be given in money and in work. The result of this arrangement we must reserve for future "Notes."

Circular to Gas Companies.

It is with profound regret—a regret which we are sure will be participated in by the gas profession at large—that we announce the death of Alfred King, Esq., of Liverpool, a gentleman deservedly esteemed by all who had the privilege of his acquaintance, and who has long been one of the most distinguished members of the body to which he belonged. This sad event occurred on Saturday morning last, at Waterloo, near Liverpool, where he had been staying for a few weeks, in the hope that change of air and scene would be beneficial to him, as he had been for some time in failing health. For the first three weeks after his removal he appeared to gain strength, and on several occasions was able to take a little walking exercise. About a month ago he became much worse, and was obliged to keep to his bed-room, which he never left again. Until last Monday, however, his relatives did not apprehend any immediate change, but on that day he became unconscious, and it was then felt that his end was near. He only recovered consciousness on a few occasions during the week, but it is satisfactory to know that in his last hours he was quite free from pain or distress of any kind. The medical opinion is that there was no disease in the system, but that he died from "exhaustion of the vital powers"—complete loss of all strength. Mr. King, whose loss we now deplore, in common with a large circle of friends and the still larger circle to which his professional reputation extended, was born on the 24th of December, 1797, and was consequently in the 70th year of his age. He was from 1824 to 1826 engaged with Messrs. Taylor and Martineau, the engineers, and was appointed engineer to the Liverpool Gas Company on the death of his brother John, the previous manager of the works, in the latter year. For nearly 41 years, therefore, he had been engineer—first to the Liverpool Gas Company, and afterwards to the Liverpool United Gaslight Company—and those who were associated with him during that long period can alone fully understand his devotion to his work, as well as the self-sacrificing spirit he ever showed in his exertions to further the interests of the company and to promote the cause of science. By his death the profession at large loses one of its brightest ornaments, and those to whom he was personally known a warm-hearted and affectionate friend.

Little progress appears to have been made during the Easter recess towards a satisfactory settlement of the Bill for amending the Metropolis Gas Act, and according to present appearances the Government have been unable to reconcile the rival interests, while they are wanting in the qualities necessary for taking a comprehensive and statesmanlike view of the questions at issue. They are willing, we believe, to alter several of the objectionable clauses of the Bill, but adhere, with strange pertinacity, to the confiscating principle of tampering with the amount of dividends guaranteed to the gas companies by Parliament. On such a basis compromise would be impossible, for, though the Bill might be so amended by a select committee as to render it acceptable to the gas companies, it would be dangerous to all property founded on parliamentary guarantee to sanction, by the second reading of the Bill, the principle that such property might be confiscated whenever "it is expedient." The Bill stood No. 17 in the orders of the day for Monday, the 29th inst., but it is probable that the motion for the second reading will not come on before

this evening, the 30th. Several attempts have been made during the recess to keep alive the agitation in favour of the Bill. In the City Court of Sewers a motion was carried to petition Parliament in favour of the second reading, but in the course of the discussion a more moderate tone was adopted by the gas agitators than they have been accustomed to assume. Mr. Bontems, the chairman of the Gas Committee, repudiated all connexion with the most objectionable confiscating clause of the Bill—as to the limitation of dividends. He said it was not suggested by the Metropolitan Board of Works nor by the Gas Committee, and he "did not know where the Govern-"ment got it from." What they proposed was, "that "the companies should be limited to a fair maximum price, "and that provision should be made for determining the "illuminating power and purity of the gas, leaving the divi-"dends to take care of themselves." No one, he said, who had taken part in those discussions desired confiscation. Mr. Davis alone stood forward to protest against petitioning in favour of "one of the most iniquitous measures ever presented "to Parliament," and animadverted on the very remarkable fact that it was the only measure in which the Corporation had ever co-operated with the Metropolitan Board of Works. The whole thing, he stated advisedly, had been got up by a small knot of individuals. Mr. Dresser Rogers has endeavoured to get up a meeting to petition in favour of the Bill in Southwark, but the power of his stentorian voice was wasted in almost vacant space. Mr. Beal, his coadjutor at the West End, was equally unsuccessful in an attempt to excite a demonstration in St. James's Hall, where he could not muster 50 persons to petition in favour of the Bill. On Saturday, a numerous deputation from the Corporation of London and from the vestries and Local Boards of the metropolis had an interview with Sir Stafford Northcote, to urge on the Government the necessity of pressing on Parliament the amendment of the Metropolis Gas Act. Mr. Bontems was at the head of the deputation, and all the speakers expressed their desire to support the Government against the interference of the joint-stock interest in their dealings with the gas companies. Sir Stafford Northcote could not but express his gratification at the promise of support, and he indulged them in return with some promises of what he would endeavour to compel the gas companies to do, and with hopes that the much-vexed question of the supply of gas to the metropolis would be satisfactorily settled. The very able manner in which the case of the gas companies has been advocated by the respectable and most influential portion of the public press, has had its effect even on the gas agitators, and Mr. Bontems, at the meeting of the Court of Sewers, alluded, and ineffectually endeavoured to reply to some of the statements in the *Times*. Even *Punch* has dealt a few strokes with his powerful baton, and, with his usual sarcastic force on the Conservative Government which has introduced a measure so liberal that it would distribute all the gain in making gas among those who consume it. That arrangement, *Punch* observes, the consumers of gas would, doubtless, find very convenient, but "there are still old-fangled notions about "honesty, and Parliament is not yet quite prepared to legalize "sheer theft." Such, indeed, is the real character of the Bill, and "anybody who has sixpence, or any larger sum, invested "in the funds, or in any English railway, or other trading com-"pany, will find his property depreciated if Parliament once "pass an Act of confiscation such as that which now the Board "of Works is smuggling through the House." So says *Mr. Punch*, and we trust the blow he has given to the Metropolis Gas Act Amendment Bill will prove as effectual as those he is accustomed to bestow on all opponents in the course of his victorious career.

Gas agitation is not confined to the Old World. There has been a "gas inquiry" at Boston, in the United States, in imitation of the metropolitan gas inquiry in the mother country, which has ended in the publication of a thick, drab-coloured report of the evidence and speeches, without further result. The report serves, however, to throw a great deal of light on the condition of gas supply in many parts of the United States, and the report consequently is valuable as a source of information. The inquiry originated in consequence of dissatisfaction felt by the "city government" at the operation of the local Act, passed in 1861, by the "corrupt influence," as alleged, of the Boston Gas Company. One question brought under consideration was the manufacture and supply of gas by the local government, but that branch of the inquiry was postponed, and such evidence as was given on the matter was very unfavourable to Corporation management. The length of streets lighted with gas in Boston is 85 miles, and the annual production of gas by the company is 373 millions of cubic feet. The coal chiefly used is Pictou coal, from Nova Scotia, which is mixed with a rich bituminous coal, called "Albert," in the proportion of from 5 to 7 per cent. of the latter, and the gas is stated to have an illuminating power of 17 candles. The Albert coal, which is procured from New Brunswick, is said to yield 35-candle gas when distilled alone. The cost of the Pictou coal in Boston was 11 dollars 40 cents per ton; that of the Albert coal is not stated. With coal at that price, the charge for gas to private consumers was 13s. per 1000 feet, the public lamps being supplied for 10s. The agitators for cheap gas in London may open their eyes wide at such prices, and may see a fine field for their labours in the United States, which it is to be hoped they will proceed to cultivate. It was stated, however, by Mr. Greenough, the agent and treasurer of the Boston Gaslight Company, that they could not supply gas at less than 9s. per 1000 feet without loss, and that the dividends did not exceed 10 per cent, A peculiar form of iron retorts, invented by Mr. Giles, the engineer of the Boston Gas-Works, is used, and those retorts are preferred to clay. Mr. Greenough was so thoroughly satisfied with the process of manufacture at Boston on a comparison with the gas-works in England and in France, that he asserted "there is no gas company where the coal is so "thoroughly carbonized as at the Boston Company, that there "is none where the condensation or washing is better, and "certainly none where the purification is better." The material used for purifying is lime, the gas passing first through wet lime and afterwards through sieves filled with dry lime. The gasholders are housed and covered in, to preserve an even temperature, and to prevent the freezing of the water lutes. There are many gasholders distributed in various parts of the city, which are connected by telegraph wires with the central dépôt, so that the state of each gasholder is self-registered, and may be known at once by the manager. Great care is taken in jointing the mains, and the quantity of unaccounted-for gas does not amount to 10 per cent. There is no prejudice in Boston against the vicinity of gasholders, and some of the best houses are built close to them. It may be that the very dangerous expedient of housing and covering them in gives a false idea of security. With regard to Corporation management, a striking illustration of the effects of it, in Philadelphia, where it has been tried and failed, was given in a report produced on the subject. The failure in the management was mainly attributed to the introduction of politics in the appointment of the trustees and their *employés*. Each set of politicians, it is said, used the works for their own ends, and the results are thus recorded:—"The malignant "and mutinous spirit which party changes always are sure to "engender, leading to malicious interference with the works, "cropping out, as is shown by the testimony, in ruptured "holders, stopped-off valves, mutilated burners, and broken "pipes, the disastrous effects upon gas-retorts, coal, and coke "from inexperienced hands, have been shown by the tables "prepared, and the comparison of one year with another." Mr. Greenough was very decisive in his opinion that it would not be in the power of the Corporation to build works and supply gas as cheaply as the Boston Gaslight Company, without taking into consideration the disastrous effects of the introduction of political feeling into the management of the works. Another important witness examined was Colonel Roome, the president of the Manhattan Gas Company at New York. He stated that the annual consumption of that company amounted to 1046 millions of cubic feet; the quantity of gas supplied nightly during the winter months being 5 million feet. The capital of the company is 4 million dollars. The quality of the gas supplied was 13 or 14 candles, the illuminating power having been lowered with the rise in the price of materials. The maximum price was limited to 9s. per 1000 feet, with a tax of 25 cents added. At that price the supply of gas had not been remunerative, the company having only paid two dividends since April, 1864, and in 1865 no profit was realized. The coal was obtained from the British provinces, and from Pennsylvania, and the price at New York was 10 dollars 17 cents, each ton of coal yielding about 9800 feet of gas. The Albert cannel, which is used at Boston, had been tried at the Manhattan works, but had been discontinued, as it was found not very manageable. From the description given of it by Colonel Roome, it seems fully to equal Boghead in the rich-

ness of the gas it produces. The material resembles pitch, and there had been a trial at New York to determine whether it is or is not coal, the decision being—as it was in the Boghead trials in this country—in favour of its being a coal. The prices charged for gas by other companies in the state of New York not restricted by a maximum price was 14s. and 16s. per 1000 feet, including the tax. Colonel Roome said the Boston Gas-Works were in a very efficient state, and that the gas made there was better than any gas made in New York. The inquiry was adjourned without any decision having been arrived at, and the gas agitators at Boston appear to have failed in making out a case against the company to warrant interference with their privileges.

The Isle of Thanet Gas Company being about to enlarge their works at Margate, which are situated in the middle of the town, an effort is making to have them removed farther off. A public meeting was recently held on the subject, at which, after much opposition on the part of those who contended that the company should be compelled to abate what was called a public nuisance at their own expense, it was resolved that a committee should be appointed to negotiate with the directors, to ascertain on what terms they would consent to remove the works out of the town. The deputation had an interview with the directors on Thursday last, when they consented to re-open the question, which they had previously refused to entertain. The proposition made to them was understood to be that the gas-works should be removed three-quarters of a mile farther to the east of the town, and that a sum not exceeding £3000 should be paid to them towards covering the requisite expenditure. A similar case recently occurred at Folkestone. The gas-works of that town were situated in what would otherwise become the best part of the town, near the Pavilion Hotel, and the company, with great liberality, consented to remove them at a heavy cost, for which they received no compensation beyond £1000 on the surrender of the lease of their premises. The gas company at Margate would do well to imitate that example of liberality, and if the Corporation make a reasonable offer, it will be to the permanent interest of the company to remove their works to a locality where they will cease to be a source of irritation and annoyance to the inhabitants.

In another part of our present number will be found a report of proceedings in the Bankruptcy Court on the adjournment *sine die* of the examination of Mr. Hedley, upon his refusal to give any explanation respecting some property alleged to have been abstracted from the estate and subsequently disposed of by raffle.

P.S.—Since the above was in type we have received copies of the correspondence which has passed between the Board of Trade and the representatives of the metropolitan gas companies subsequent to the memorandum handed to Sir Stafford Northcote by Mr. Beck, the governor of the Chartered Gas Company, and printed in our last, from which it will be seen that no compromise has been agreed upon, and that the question will, after all, have to be settled in Parliament:—

Resolution of Chairmen of Gas Companies left by Mr. Beck at the Board of Trade on the 12th of April, 1867.

Resolved—"That under a fair system of penalties the companies will not object to the deduction from their dividends of such penalties, if incurred."

Letter from Mr. Beck to Mr. Farrer.
Chartered Gas Company, Horseferry Road, Westminster, S.W., April 23, 1867.

Dear Sir,—I have again brought before the committee of chairmen of the metropolitan gas companies the bill introduced for regulating the supply of gas to the metropolis: and I now return you a print of the bill, striking out those clauses which have led to the opposition upon the second reading, and to which the companies cannot in any way assent.

If the present bill be withdrawn, and another introduced omitting these clauses, the companies will not oppose the second reading and the reference to a committee. The companies adhere to the terms of the resolution of the chairmen's committee, communicated to you on the 12th instant. To most of the remaining clauses, however, of the bill the companies entertain the strongest objections; but it will doubtless be more satisfactory to the public that these should be debated and settled upon evidence given in committee, the companies holding themselves at perfect liberty to oppose such clauses in committee, although they abstain from any opposition on the second reading.—I am, &c.,

(Signed) S. Adams Beck, Chairman.

T. H. Farrer, Esq., Board of Trade.

May I request the favour of an early answer to the above address?

Letter from Mr. Farrer to Mr. Beck, enclosing proposed Alterations in Bill.
Board of Trade, April 23, 1867.

Dear Sir,—I have laid before Sir Stafford Northcote your letter of this date, with its enclosure, on the subject of the Metropolis Gas Bill. I have also informed him of the result of our previous communications. He has carefully considered these, as well as the printed observations of the companies upon the bill, with the view of effecting, if possible, the object which the companies, as well as the consumers, have in view—viz., that this long-disputed question should be disposed of in the present session.

With this object he is willing to alter the bill to the effect shown in the accompanying paper, provided that the bill so altered is likely to afford a basis for a satisfactory settlement.

If this appears to be the case, Sir Stafford Northcote will take steps to have the bill altered accordingly, leaving disputed points, as suggested by you, "to be debated and settled upon evidence given in committee."

It seems to him that the withdrawal of the bill is open to serious objections; one of these is, that it might prevent a settlement of the question during the present session.

As the answer of the companies will materially affect the course the Government may take on Monday, I am to request that Sir Stafford Northcote may have an answer at your earliest convenience.—Believe me, &c.,

S. A. Beck, Esq. (Signed) T. H. Farrer.

[Enclosure.]

Alterations in the Metropolis Gas Act proposed to the Companies before Second Reading.

Omit the permissive powers to purchase.

Omit the clauses which reduce the price on account of defective power or purity.

Impose efficient penalties for defective power or purity, bearing same proportion either to the capital or to the quantity of gas supplied by the several companies, so that the penalty may bear a fair proportion to the breach of statutory obligation.

Let the liability to them be determined, not by evidence in court, but by the report of the examiner.

Make the penalties fall efficiently and exclusively on the dividends.

Omit the clauses fixing the standard price of gas.

Let the present standard maximum price of gas be determined by the select committee, with some power such as there is in the present Act to raise it, if circumstances so require; and also with power to lower it, if circumstances so require.

Let the standard dividend for each company be fixed at the average of actual dividend paid by that company during a given number of years; the number of years to be determined by the select committee.

Let the dividend rise in proportion to the reduction of price from the point of standard price, that point being determined as above mentioned; and let it be again reduced if the price is afterwards raised.

Letter from Mr. Beck to Mr. Farrer.
Chartered Gas Company, Horseferry Road, Westminster, April 26, 1867.

Dear Sir,—Your letter of the 23rd inst., forwarding a statement of the alterations proposed by the Board of Trade to be made in the Metropolis Gas Bill, with a view to avoid opposition to the bill on the second reading, has been laid before the committee of chairmen of the metropolitan gas companies to-day. The committee regret to find that the proposals made do not in any degree yield the principle for which the companies have always contended, and which they cannot now forego—viz., the maintenance of the General Act of 1847, which regulates gas companies in the United Kingdom generally, and upon the faith of which their capitals have been subscribed.

I am instructed to return you herewith the statement altered in red ink,* in such particulars only as the companies consider indispensable.

I also enclose a print of the bill, with clauses 4, 28, 29, 34, 49, and 50, struck out, and am desired to suggest that if the views of the companies be agreed to by the Government, the proceeding to be adopted on the motion for second reading should be as follows, viz.:—

That the bill should be permitted to pass second reading unchallenged, on the understanding that Sir Stafford Northcote shall at the same time state to the House the modifications agreed to, which he intends to make in the bill, and that the bill should thereupon be committed to a committee of the whole House, for the purpose of striking out the clauses before enumerated, and that it should be in the altered shape reprinted before reference to a select committee.

I am to repeat that the submission of the companies to the course proposed must in no case be held to preclude their opposition to any of the clauses of the bill in committee, or in its subsequent stages in the House.

Hoping to receive at as early an hour to-morrow as possible such a reply as may render unnecessary any opposition on the part of the companies to the second reading of the bill, I am, &c.,

(Signed) S. Adams Beck.

T. H. Farrer, Esq., Secretary, Board of Trade.

[Enclosure.]

Alterations in the Metropolis Gas Act proposed to the Companies before Second Reading, as altered by the Gas Companies.

[*Note.*—The words proposed to be left out are printed in small capital type and those to be inserted are printed in *italics*.]

1. Omit the permissive power to purchase.
2. Omit the clauses which reduce the price on account of defective power or purity.
3. Impose efficient penalties for defective power or purity, leaving SAME *some* proportion EITHER TO THE CAPITAL OR to the quantity of *bad* gas supplied by the several companies, so that the penalty may bear a fair proportion to the breach of statutory obligation.
4. Let the liability to them be determined not by evidence in court, but by the report of the *chief gas* examiner, *after hearing the company in case of dispute*.
5. Make the penalties fall efficiently and exclusively on the dividend.
6. Omit the clauses fixing the standard price of gas.
7. Let the present standard and maximum price of gas be determined by THE SELECT COMMITTEE, *Parliament, having regard to the present prescribed rates of dividend*, with some power such as there is in the present Act to raise it, if circumstances so require; and also with power to lower it *to the standard maximum*, if circumstances so require.
8. LET THE STANDARD DIVIDEND FOR EACH COMPANY BE FIXED AT THE AVERAGE OF ACTUAL DIVIDEND PAID BY THAT COMPANY DURING A GIVEN NUMBER OF YEARS: THE NUMBER OF YEARS TO BE DETERMINED BY THE SELECT COMMITTEE.
9. Let the *present prescribed rate of* dividend rise in proportion to the reduction of price from the point of standard price, that point being determined as above mentioned *in clause* 7, and let it be again reduced *to the prescribed rate* if the price if afterwards raised.

* The words proposed to be left out are printed in small capital type, and those to be inserted are printed in *italics*.

10. *Omit clause 4 in the bill (repeal as in schedule), and, of course, the schedule itself.*

Letter from Mr. Farrer to Mr. Beck.

Board of Trade, April 27, 1867.

Dear Sir,—I have to acknowledge your letter of yesterday's date, which I have this morning laid before Sir Stafford Northcote.

He desires me to say that, having carefully considered the proposals contained in your letter and its enclosure, he is unable, consistently with the position the Government have assumed as arbitrators between the gas companies and the consumers, to accept those proposals.

It appears to him that the principal point for which the gas companies contend is, as stated in your letter, "the maintenance of the General Act of 1847, which regulates gas companies in the United Kingdom generally, and upon the faith of which their capitals have been subscribed."

If this were the only question at issue Sir Stafford Northcote would not be prepared to dispute it, but it is to be remembered that the operation of this principle is entirely altered by the Act of 1860. Before that Act there was competition in the metropolis. Under that Act there has been and is complete monopoly. If the companies desire to be placed on the footing on which they stood when their capital was subscribed, the proper course to effect that object would be to repeal the Act of 1860.

I am further to remind you, with reference to the figures concerning price, penalties, and dividends contained in the bill, that Sir Stafford Northcote, both before and after the bill was introduced, expressed his willingness to omit these figures altogether, so as not to prejudice either party before the select committee to whom the bill was to be referred. This proposal was not considered satisfactory by the companies, and, after hearing their objections to the bill, Sir Stafford Northcote expressed his readiness to make the alterations in the bill contained in my letter of the 23rd instant.

His object in making these concessions was to meet the views of the companies as far as was consistent with justice to the public, and thus to prevent delay and save costs to all parties.

The principles, however, to which he felt bound to adhere, are as follows:—

First, to provide that effectual penalties for supplying improper gas shall really fall on the companies, and not on the consumer.

Secondly, to provide that, if circumstances change, there shall be a means of varying the standard price of gas, either upwards in favour of the companies, or downwards in favour of the consumer, as the case may require.

Thirdly, to provide that for the present rule which limits the maximum profits of the companies to 10 per cent., and which thus destroys all motive for exertion, there shall be substituted a sliding scale, of which the lowest point shall be the actual present profits of the companies, calculated on an average of a certain number of years, and which shall be capable of rising indefinitely in proportion as the price of gas is lowered.

It now appears from your letter that the companies are willing to assent to the first of these propositions, to the extent at any rate of having the question inquired into by a committee; but that, as regards the two others, the companies not only do not assent to them, but refuse to assent to any inquiry before a select committee, unless these points are wholly withdrawn from its consideration.

Considering the strict and complete monopoly of gas which now exists in London; considering that the history of gas, from its first introduction to the present time, shows a constant reduction in cost; considering, lastly, that the present circumstances of the gas supply in London are such as specially lead to the conclusion that there is much room for improvement in manufacture and for future reduction in cost, Sir Stafford Northcote is of opinion that a full discussion of the two provisions in question is essential, and that it is impossible for him to undertake to withdraw those provisions from the consideration of the select committee to which the bill will be referred.

In conclusion, I am to state, that however much Sir Stafford Northcote may regret that his efforts to save the time of Parliament and the expense to parties should prove ineffectual, he feels that if the gas companies adhere to the propositions contained in your letter of the 26th instant, and still reject the concessions which he has expressed his readiness to make, there is no course for him but to leave the whole question to be determined by Parliament in the usual way.—Believe me, &c.,

(Signed) T. H. Farrer.

S. A. Beck, Esq., Chartered Gas Company, Horseferry Road.

Communicated Article.

ON DEFECTS IN THE APPARATUS GENERALLY USED FOR THE DETERMINATION OF BISULPHIDE OF CARBON IN COAL GAS, AND DESCRIPTION OF A NEW APPARATUS FOR ITS ESTIMATION.

By Alfred G. Anderson, Esq.,

Professor of Chemistry and Practical Chemistry in Queen's College, Birmingham, &c.

(*Continued from page* 206, *vol.* xvi.)

As it is scarcely possible to maintain the contents of the U-tubes throughout the process in a state of brisk agitation by the operation of the "aspirator" without causing the under side of their corks occasionally to have a small quantity of the violently shaken potassa solution thrown up or "splashed" against them, it is necessary, to begin with, that every one of these corks should be cleansed thoroughly from anything so thrown in contact by warm water. For this purpose, the right-angled tubes *e' e e e e e x*, are respectively placed astride two small beakers of warm water, stood side by side, so that the two corks attached to each lower limb are placed beneath the surface of the warm fluid. After being allowed to soak for five or six minutes, they are removed, carefully shaken to free them from adherent water; the contents of the beakers added to the condensed products removed from M evaporating for the subsequent treatment with chlorine; fresh warm water placed in the beakers, and the cork-soaking process again repeated as before. If the right-angled tubes *e' e e e e e x* then have their interiors rinsed with warm water from the washing bottle, and the cork exposure to the action of warm water once more be brought into requisition, it is, I find, always certain that we avoid any possible loss of sulphurous condensed products through their adhering to, or passing into the interstices of, the corks. Whilst these manipulations with the corks are proceeding, the U-tubes should be placed inverted carefully over beakers to drain off their potassa solution. When the alkaline liquor has thoroughly run off, they may be easily washed quite clean by the addition, first, of a little dilute hydrochloric acid; lastly, some warm water. The warm rinsing water may be made to come in contact with every part of the inside of the tubes by closing both openings with clean sound corks, and then shaking the water inside it to and fro. The complete control over all the alkaline fluids employed to condense the sulphurous portions is completed by pouring any fluid which may have accumulated in the last vessel of the series, *g*, among the other mixed products, and, finally, after washing it clean with pure water, adding these washings likewise to the mixed products.

2·36 grains of sulphate of barium were deposited from the whole bulk of the liquids of the condenser, tubes, &c.; when thus removed they had been treated with chlorine, filtered, and mixed with chloride of barium, after careful evaporation to a moderate degree of concentration. When potassa solution is used after the transmission of the chlorine, and the subsequent application of heat, it is as well, before mixing with the barytic salt, to feebly acidify by the addition of a small quantity of hydrochloric acid.

To get at the exact quantity of sulphate of barium equivalent to the sulphur of the volume of gas examined, in this precipitate found to weigh 2·36 grains, it was only necessary to extend the examination a little further, and make the following analysis and calculation. The flask and a portion of the potassa solution taken from the stock bottle was weighed, some poured out into a beaker, and the flask again weighed. In this way it was found that 716·40 grains of potassa solution had been removed into the beaker. Although no real necessity existed for the transmission of a stream of chlorine into this weighed portion, yet it was so treated, and the rest of the details of the usual method of proceeding observed before mixing with chloride of barium to separate its sulphuric acid. Exactly ·25 grain of sulphate of barium was in this way separated, after the regular allowance of time for its proper deposition from the 716·40 grains of potassa assay.

Then the calculation—

716·40 : ·25 :: 1139·21 : ·39

proves that the proportion of solution of potassa put into the U-tubes contained, as impurity, sulphuric acid equivalent to ·39 grains of sulphate of barium.

And, further, the total quantity of sulphate of barium precipitated	equal	2·36 grains
Less		·39
Gives		1·97 grains

as the quantity of sulphur of barium actually proportionate to the sulphur of the gas determined by the tube system.

Therefore we find the following comparative results obtained by the two methods of proceeding:—

Table of Comparison of two Modes of Analysis followed, in which, in the first instance, the Method giving, as usually adopted (with the addition of the "Desulphurizer"), the Maximum Proportion of Sulphur was Tested against the System of Complete Condensation of Sulphurous Products of Combustion, by the addition of U-tubes of Potassa Solution.

Experiments.	Quantity of Gas analyzed.	Description of Burner used.	Whether "Desulphurizer" was used or not.	Whether Condensing U-tubes were added or not.	Quantity of Sulphate of Barium obtained.	Amount of Sulphur in 100 Cub. Feet.
8 ..	2½ c. feet ..	Single jet ..	Yes ..	No ..	1·63 ..	8·93 gr
9 ..	2½ c. feet ..	Same ..	Yes ..	Yes ..	1·97 ..	10·79 gr.

The three experiments, respectively numbered 10, 11, and 12, to follow immediately in detail, were made with a volume of coal gas divided into three exact equal bulks. The sulphur of the first bulk, No. 10, was estimated in every respect precisely similar to experiment No. 8 of the above table, with the two open condensers, &c. In the case of experiment No. 11, the second open condenser was removed and replaced by the six U-tubes, &c., into which 1276·70 grains of the same solution of potassa was poured to act as the perfect sulphurous absorber. In all other respects the proceedings observed in this experiment were perfectly alike to those followed in making experiment 9. Experiment No. 12 was a simple repetition in every particular (with the single exception that 915·60 grains of the potassa liquid were added to the U-tubes) of experiment No. 11. Its object was to ascertain what degree of accuracy could be attained by a comparison of results in

the proportions of sulphur determined in the two estimations, for a comparative trial of this kind, it is obvious, must afford very certain evidence of the efficiency or unfitness for the purpose sought.

In experiment No. 10 the weight of sulphate of barium obtained was 1·60 grains.

In experiment No. 11 the weight of sulphate of barium obtained was 2·60 grains. The calculation—

716·40 : ·25 :: 1276·70 : ·44.

And 2·60 less ·44 becomes 2·16—the true quantity of sulphate of barium equivalent to the sulphur of the measured volume of gas so estimated.

In experiment No. 12 the gross weight of sulphate of barium from the mixed solutions of potassa and ammonia was 2·50 grains. Following the same system of calculation—

716·40 : ·25 :: 915·60 : ·31.

And 2·50 less ·31 becomes 2·19—the exact amount of sulphur in the gas corresponding to what had been capable of determination by the method.

Now, the difference between the quantities 2·16 of experiment No. 11 and 2·19 of experiment No. 12 (·03) is so insignificant that the issue certainly points to complete accuracy of determination, provided perfect combustion of all its sulphur be ensured, being possible by this means. The combustion of the gas occupied in No. 11 exactly eight hours; in No. 12, nearly eleven hours. In the first the gas was not only burned with greater rapidity, but a more rapid rate of transmission of air through the apparatus was maintained from the beginning to the termination of the analysis; yet it appears that complete retention of the sulphurous fumes by the alkaline solutions was in no degree impaired by this accelerated effect.

Before placing experiments 10, 11, and 12 side by side for contrast, two more trials of the capabilities of the apparatus were made with another volume of gas as usual, equally divided under circumstances slightly modified. Instead of placing a weighed portion of potassa solution in the U-tubes, strong ammonia was added to these vessels. If strong ammonia, it was considered, would operate as a condensing material when agitated in the U-tubes as efficiently as solution of potassa, its substitution in this way must offer many advantages over the employment of the latter for the purpose. Thus the weighing of the potassa would be unnecessary, which, though a manipulation, when performed as I have described, simple and easy, nevertheless occupies some little time. Then ammonia is without difficulty obtained from manufacturing chemists perfectly free from any trace of sulphuric acid, so that the analysis of either the solution of potassa or solution of ammonia in the first instance, for after-deduction from the total determination of barytic sulphate, would again be entirely dispensed with. And, further, the addition of as much ammonia to the first condenser and the U-tube series as would suffice to well occupy the interior of those vessels, while the combustion continued, with liquid and gaseous ammonia, it was believed would thoroughly contribute to fix every particle of sulphurous acid as its vapour was successively drawn through them. To test this point, 4 fluid ounces of ammonia were added to the first large receiver M, and one fluid ounce to each of the U-tubes, in the experiment made to compare this use of ammonia, which immediately follows. At the termination of the operation the liquid in the last three U-tubes possessed a strong odour of free ammonia, and the considerable degree of cold produced in them by evaporation of some of the ammonia as the air rushes through on its road to the aspirator promotes the absorption of ammoniacal fumes brought in from the anterior vessels.

These two experiments shall be called Nos. 13 and 14.

No. 13, the first half bulk, burned in association with "Desulphurizer" and the two condensers, made to correspond precisely with No. 8, gave of sulphate of barium exactly 1·60 grains.

No. 14, the second half, burned with the addition of the U-tubes, &c., gave of the same precipitate 2·11 grains.

The coincidence of this analysis with Nos. 10, 11, and 12, is, for the success of the apparatus, as satisfactory as it is even remarkable. The gas submitted to examination in each of the eight experiments was unquestionably identical; the first bulk had been removed early in the morning from the company's main, and replaced late at night by the last bulk from the same source.

It will now be convenient to place the results of these five experiments—10, 11, 12, 13 and 14—in the form of a table, as upon former occasions. We shall then see what degree of uniformity exists in regard to the one point having great interest to all who devote attention to this subject—that is, the proportion of sulphurous fumes which, as these experiments it will now be seen at a mere glance conclusively establish, always escape fixation in the receivers when, as they have been hitherto adapted in the process, they are always more or less open to the external atmosphere.

Table showing Results obtained by comparing the maximum determination quantity of Coal Gas Sulphur possible, having two large Receivers containing strong Ammonia connected to the best form of Jet caused to burn the Gas inside the atmospheric "Desulphurizing" Vessel, with the Estimation effected when, instead of the second Receiver, the U-tubes, "Aspirator," &c., were employed, as has been described.

	Expt.	Quantity of Gas analyzed.	Description of Burner used.	Whether "Desulphurizer" was used.	Whether U-tubes were used.	Quantity Sulphate of Barium obtained.	Amount Sulphur in 100 Cubic Feet.
First Volume.	10	2½ c. ft.	Single Fishtail	Yes	No	1·60	8·76 gr.
	11	2½ c. ft.	Same Jet	Yes	Yes, with Potassa	2·16	11·83 gr.
	12	2½ c. ft.	Same Jet	Yes	Yes, with Potassa	2·19	12·00 gr.
Sec. ditto.	13	2½ c. ft.	Same Jet	Yes	No.	1·60	8·76 gr.
	14	2½ c. ft.	Same Jet	Yes	Yes, with Ammonia	2·11	11·56 gr.

A consideration of these tabulated quantities and the calculations underneath demonstrate that the proportion of sulphurous products which are not absorbed by the ammonia of the open receivers, or become in any manner condensed there, is a very constant quantity. This is proved by taking the mean of Nos. 11 and 12, that is, 11·91 grains,

then 8·76

and 8·76 : 3·15 :: 100 : 35·95 per cent.

Further, the difference between 8·76 and 11·56 of experiments 13 and 14 is 2·8:—

Then 8·76 : 2·8 :: 100 : 31·96 per cent.

The mean of the two per centages of loss 35·95 and 31·96 is 33·95 per cent. In round numbers, consequently, the loss of sulphur through non-condensation amounts, it is decidedly proved, to *thirty-four per cent* when every precaution is taken to burn the gas slowly and steadily; to control the current of atmospheric air, on passing through the condensers, by the addition of the "desulphurizing" vessel, and thus ensure that every possible amount of condensable products be retained in those vessels. That the slight difference between the quantities 35·95 and 31·96 (3·99 per cent.) arises from any other source than a little irregularity in the burning of the gas, and not from absorption defects incidental to the action of the U-tubes, is rendered very certain by the very close coincidence in the quantities brought out in the experiments 11 and 12. No conclusion can be more safely assumed than that not a particle of the sulphurous products of the combustion of the gas can escape being absorbed by the liquid of the U-tubes, especially if solution of potassa be placed in them for the purpose. It is easy to see, by watching the operation, that the gaseous mixture of the atmosphere and burnt products of the gas, from forming an emulsion with the fluid of every tube as they are drawn through by the action of the "aspirator," are brought into most intimate admixture with the alkaline fluid so keenly active in retaining in combination whatever acidulous vapours may come in contact with it.

(To be continued)

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

1102.—John Shore, of 19 and 20, Cardigan Street, Birmingham, in the co. of Warwick, brassfounder, for "*The natural self tighting valve-cock, he same valve to be applied to pumps, &c.*" April 13, 1867.

1123.—George Simpson, of Glasgow, in the co. of Lanark, N.B., civil and mining engineer, for "*Improvements in machinery for working mining or excavating tools, boring tools, and mine or other pumps.*" April 16, 1867.

1158.—Richard Hastings Frith, of 101, Lower Gardiner Street, in the City of Dublin, civil engineer, for "*Improvements in distributing and measuring gas, steam, water, and other fluids, and in the apparatus or means employed therein.*" April 20, 1867.

1166.—Daniel Fryer, of 18, Carlton Square, O d Kent Road, agent, for "*Improvements in lamps.*" April 22 1867.

1181.—Alfred Vincent Newton, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in the construction of blowing and pumping engines.*" A communication. April 23, 1867.

1191.—Thomas South, of Bridge Street, Southwark, in the co. of Surrey, gas-fitter, for "*A combined gas lighting and cooking apparatus.*" April 24, 1867.

1194.—Theodore Lemielle, of Valenciennes, in the empire of France, civil engineer, for "*A new improved apparatus applicable to the ventilation of mines, buildings, and other places.*" April 25, 1867.

1199.—Charles Edgar Wetton and William Galsworthy, both of Grimsbury, in the co. of Northampton, for "*Improvements in apparatus for regulating the supply of liquids or fluids.*" April 25, 1867.

GRANTS OF PROVISIONAL PROTECTION.

597.—William Edward Gedge, of the firm of John Gedge and Son, of 11, Wellington Street, Strand, in the co. of Middlesex, patent agent, for "*Improvements in privies or water-closets.*" A communication. March 4, 1867.

608.—Henri Ulliel, of the Avenue de Neuilly, in the department of Seine, France, manufacturer of gas apparatus, for "*Improved apparatus for the production or improvement of inflammable gases.*" March 5, 1867.

753.—Nathan Thompson, of 15, Abbey Gardens, St. John's Wood, in the co. of Middlesex, for "*Improvements in connecting the ends of pipes and tubes.*" March 15, 1867.

819.—James Greenshields, of Glasgow, in the co. of Lanark, N.B., for "*An improved compound or combination of materials to be used for the production of illuminating gas.*" March 21, 1867.

833.—John Hathornthwaite Winder, of Sheffield, in the co. of York, manufacturer, for "*An improved rotary pump for raising or forcing fluids.*" March 22, 1867.

928.—Eugène Canton, of La Rochelle, in the empire of France, for "*A counting and controlling cock for liquids.*" March 29, 1867.

936.—Edwin William Ball, of Birmingham, in the co. of Warwick, manufacturer, for "*Improvements in gas fireplaces and gas-stoves, and in apparatus for heating conservatories and other rooms.*" March 29, 1867.

941.—Richard Canham, of Clerkenwell, in the co. of Middlesex, and Frederick William Kreut, of Guildford Street, Farringdon Road, also in the co. of Middlesex, for "*Improvements in means or apparatus employed in the cure of smoky chimneys, and in ventilating buildings and other places.*" March 30, 1867.

965.—Charles Denton Abel, of 20, Southampton Buildings, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improvements in compositions for treating fluids employed for illuminating purposes.*" A communication. April 1, 1867.

998.—John Augustus Bouck, of Manchester, in the co. of Lancaster, manufacturing chemist, for "*Improvements in burning petroleum, creosote, gas tar, and other such fluid bodies capable of being used as fuel.*" April 3, 1867.

1026.—Stephen Matthews, of Chapel Row, Portsea, in the co. of Hants, for "*An improved combined lift and force-pump.*" April 5, 1867.

1027.—William Adair, of Liverpool, in the co. of Lancaster, for "*Improvements in pumps.*" April 5, 1867.

1029.—Henry Wilson, of Stockton-on-Tees, in the co. of Durham, for "*Improvements in cocks or valves for discharging water, oil, and other fluids or gases.*" April 6, 1867.

1037.—Graham Stuart, of Sheffield, in the co. of York, for "*Improvements in taps and valves used for regulating or restraining the flow of water or other liquids, steam, or gases.*" April 6, 1867.

1040.—Clinton Edgcumbe Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet Street, in the City of London, patent agent, for "*Improved means of producing oxygen.*" A communication. April 6, 1867.

1045.—William Robert Lake, of 8, Southampton Buildings, Chancery Lane, in the co. of Middlesex, consulting engineer, for "*An improved combined water-meter and force-pump.*" A communication. April 6, 1867.

1058.—John Lacey Davies, of the firm of John Davies and Son, of 4, St. Ann's Square, Manchester, in the co. of Lancaster, patent agent, for "*Certain improvements in the method of purifying smoke and in apparatus connected therewith.*" A communication. April 9, 1867.

NOTICES TO PROCEED.

3226.—Alexander Colvin Fraser, of Colchester, in the co. of Essex, for "*Improvements in apparatus used in the manufacture of gas.*" Dec. 7, 1866.

3242.—William Warren, of Alstone, near Cheltenham, in the co. of Gloucester, machinist and engineer, for "*Improvements in pumps.*" Dec. 8, 1866.

3258.—Edmund Small Cathels, of Lower Sydenham, in the co. of Kent, gas engineer, for "*Improvements in apparatus for conveying and regulating the supply of gas.*" Dec. 11, 1866.

3296.—Thomas Hoey, of Glasgow, in the co. of Lanark, N.B., engineer, for "*Improvements in arrangements and apparatus for measuring and controlling the supply of water for closets and general uses, and for the deodorization, removal, and utilization of excrementary matters.*" Dec. 15, 1866.

3332.—Samuel Buxton, of Hunslet, in the co. of York, contractor, for "*An improved stench-trap.*" Dec. 19, 1866.

3401.—William Bradburn, of Wednesfield, Wolverhampton, in the co. of Stafford, artificial manure manufacturer, for "*Improvements in treating excrementitious matters, and other refuse matters, for the purpose of obtaining valuable products therefrom, and in apparatus to be employed for that purpose.*" Dec. 28, 1866.

211.—John James Lundy, of Leith, in the co. of Mid Lothian, N.B., colour, grease, and chemical manufacturer, for "*Improvements in the treatment of the residual matters resulting from and obtained in the purification and distillation of mineral or hydrocarbon oils, and also in the treatment of coal tar and various waste or other alkaline and lime substances, for the purpose of utilizing the same.*" Jan. 26, 1867.

790.—James Hislop, manager of the Gas-Works, Ayr, N.B., for "*Improvements in the arrangement of apparatus for 'scurfing' or removing carbon from gas-retorts.*" March 19, 1867.

Parliamentary Intelligence.

HOUSE OF LORDS.

(*Present:*—*Viscount* Sydney, *Chairman; the Earl of* Cork, *Lord* De Saumarez, *Earl* Cowper, *and Viscount* Keene.)

PAIGNTON WATER BILL.

FRIDAY, MARCH 15.

Mr. Vernon Harcourt, Q.C., and Mr. J. Clarke appeared for the promoters; and Mr. Wrenfordsley for petitioners against the bill.

Mr. Harcourt said the bill was not one of great magnitude, though of some importance to the parish of Paignton, which was a place of a certain amount of population situated in the neighbourhood of Torquay, in the county of Devon. Paignton at present was extremely ill supplied with water; it was a place where residential houses were beginning to be erected, it was near to the sea, and was likely to increase in every direction. The object of the bill was to supply it with pure water, the present supply being impure and not sufficient in quantity, and, moreover, water was wanted for the extinguishing of fires, so that in every respect a better supply would be of great public benefit. Now, the inhabitants had their supply first from a stream called the "mill leet" or "town lake," that being, in point of fact, a diversion from a natural stream which ran down to the sea near Paignton Harbour. For the purpose of supplying the mill there was a lake, and it ran through various farm lands and places till it reached the town of Paignton, where, being an open leet, the water became polluted in many ways, and so it was rendered unfit for supplying the population with water in that state of purity so much desired. The water of this stream was used by a considerable portion of the population, and there was, besides this, several private wells in the parish, but the water in them was more or less polluted, and it was not at all suited for domestic purposes. In the parish was also a well, known as Paignton well, which contained water of moderate quality. It was an open place close to the road, and to it people had access, and the water was fetched by them in their pails and carried to their houses as it was required. This well formed one of the sources from which the promoters of the bill proposed to take their supply, but at the same time it must be understood they did not intend to deprive the inhabitants of the use of the water which they had hitherto enjoyed. The promoters would still permit their having access to the water in the well, but they intended to divert the overflow of water into their water-works, which would be constructed in its locality. They proposed to take for their purpose the water which at present flowed down the mill leet or town lake, to a spot where the leet, in point of fact, was diverted from the natural bed of the stream, to take it at a point where it was pure and of good quality, and to carry it down by pipes of six inches diameter to Paignton; and this they proposed to take, with the exception of such storm waters which at present flowed in the direction of the sea. There was a farm called Firmley Farm, through which the leet at present ran, and by which the water was polluted. Provisions were inserted in the bill for keeping that water clear by carrying it by pipes through the farm; and the result of this would be, that water which was now polluted by the sewage of cattle, and so forth, would be protected and taken down in a pure state to the town. With regard to Paignton well, he might observe that it was an abundant spring; and what they proposed to do with that was, to protect it from the inroads of cattle, which at present were allowed to drink out of it; and after leaving the public to take as much of it as they pleased out of a tank, to carry the surplus into a reservoir to be constructed on the site of the mill pond, and so distribute it through service-pipes into the lower parts of the town. They did not intend to deal with the water of this well for the upper service because it was low, and would have to be pumped up. It was obvious that the scheme would extremely improve the existing supply. There were a large number of houses in the parish, which at present were supplied by private wells; but it would appear that the water of those wells was full of salts of various kinds, for an analysis of the water showed that it was impure and not of a quality fit for domestic consumption. He would have supposed, then, that a scheme of this kind would have been entirely unobjectionable, but such did not appear to be the case; and before he proceeded further with the details, he would call their lordships attention to a petition of certain inhabitants, and the rule which was adopted in respect to such petitions in the lower House of Parliament. The petitioners, as he believed, had no *locus standi*, as they could not prove that they would be individually affected by the bill, the preamble of which stated "that the population of the parish and town of Paignton, in the county of Devon, is large and rapidly increasing, and from its vicinity to the town of Torquay is likely to become considerable; and there is no good and sufficient supply of water thereto for sanitary and domestic purposes, and for the extinguishing of fires, and such supply would be of great public benefit; and whereas the persons hereinafter named are willing, at their own expense, to provide such supply of water, and for that purpose to construct and maintain the works hereinafter mentioned, and to carry such undertaking into execution; but the same cannot be effected without the authority of Parliament." The bill states that until a general meeting shall otherwise decide, the number of directors should be four, and Messrs. Robert Fletcher, John Finney Belfield, William Froude, and Charles Kitson should be the first directors of the company; and the company might from time to time vary the number of directors, so that the number be not more than seven nor less than three. The point he (the learned counsel) would raise against the *locus standi* of the petitioners was that those gentlemen were not the authorities who were entitled to be heard in the matter. Their lordships would observe in their petition that there was no single objection on the part of one of those petitioners that he himself would be deprived of water by the passing of the bill, or that he would suffer any individual injury, and consequently, under the rule laid down in the House of Commons, they had no *locus standi* whatever to appear. It was true there were no Standing Orders upon this subject in their lordships House; but he had always, in the course of his experience, found the practice of the lower House in these matters to be extremely expedient and proper, and it was necessary that the practice of the two Houses should be assimilated one to the other as much as possible. In the House of Commons, since the Court of Referees had been established, the principles of *locus standi* were beginning to be much better understood, and more carefully guardedand explained. Now, in that House there was a Standing Order that it should be competent to the referees to hear the case of petitioners who were the corporation or the authorities of a town, and entitled to be heard against a bill. Of course the questions were numerous upon the Standing Orders, and a great many decisions had been given in the Court of Referees upon the subject; but it was quite clear to his mind that petitioners—such as those represented by his friend—could not be heard before a committee of the House of Commons. They did not, as he had said, state that they themselves were individually injured, or were likely to suffer from the establishment of water-works in the town, there was nothing to show that they were likely to be affected apart from the whole community. Of course, if such was the case, it would be a matter bearing quite another complexion, and they would appear on a different basis altogether; but, as he alleged, they did not represent that they were injured in any way apart from the community at large, therefore their *locus standi* would have to rest upon their right to represent the town of which they were individually members. The rule in the House of Commons was, that the proper parties to represent the community in such a case were the municipal body, or party having the local management of the town. Those were the proper parties to represent the interests of a town; but in this instance, as he should have the pleasure to show, the authorities having the management of the affairs of Paignton actually petitioned in favour of the bill, and the question was therefore raised that now that their lordships had got the party who were the constituted authorities of place petitioning in favour of bill, they could not hear parties against it who had not the local management, and who themselves were unable to state that they would be individually injured by the passing of the bill. If such were their lordships view of the case, then the petitioners would have no *locus standi* to appear. Whatever grievance was likely to be occasioned by the passing of a bill, those who petitioned must, as he had stated, show that they were personally or individually aggrieved, which the petitioners in this case had failed to do, and therefore, in short, they, not being the authorized representatives of the town, were not entitled to be heard. In a town were there were municipal authorities the case was clear. Where there was a local board the case was clear, and parties had been allowed to have their *locus standi*; but supposing that the local board did not appear against the bill, and the petitioners were to appear simply as general inhabitants, unless they were indi-

vidually aggrieved they could not be heard. The learned gentleman, to support his argument, quoted from "Smithers on *Locus Standi*," and observed that in the case of Paignton it did not appear that the inhabitants generally disapproved of the bill. There was a petition of the inhabitants in its favour, and there was a petition from the local board, as the representatives of the town, and against these two was the petition of a number of persons who were merely inhabitants, and whose rights were not proved as likely to be affected by such a measure as the one he had the honour to support. Were they going to hear inhabitants both for and against the bill? And were they to become the judges as to which of those bodies belonged the right of representing the public at large? Would their lordships strike the name out in each petition, and strike a balance, or would they count noses on such an occasion? If they were to take the balance as respected numbers, then he was bound to say they would find a majority of about five against the bill; but taking the rateable value of the properties occupied by either side, the balance would be considerably in favour of it. Under these circumstances he would ask their lordships to decide before they proceeded further whether the petitioner represented by his friend had a right to appears.

Mr. WRENFORDSLEY said that he appeared on behalf of certain of the inhabitants of Paignton who petitioned against the bill, and in arguing the question of *locus standi*, he proposed to refer to the same authority as that quoted by his learned friend—viz., "Smithers on *Locus Standi*," and he thought he should be able to show that the premises upon which his argument was based were wholly wrong. In the first place, he would observe that Paignton was a small town of not more than 3500 inhabitants, and it contained, as was true, a local board, and a board of Harbour Commissioners, to which his learned friend had not referred.

Mr. VERNON HARCOURT: There is no petition from the harbour board.

Mr. WRENFORDSLEY continued: The petition that had been placed in his hands was signed by 123 persons out of that small constituency, and it was headed with the name of Lady Julia Lockwood, Mr. Lockwood, and comprised as many as 51 of the principal landowners of the place. The first witness he would call would be a landowner, and a member of each of the authorities of the town, and, moreover, was secretary of the harbour board, and also a guardian of the poor; and he felt it was impossible for him (the learned gentleman) to suggest to their lordships any class of persons who were more interested in the passing of the bill than those who had signed the petition that had been entrusted to his hands. Now, as to *locus standi*, he would refer to Smithers's work, and there, at page 37, he found a general rule that where persons in business in a town through which a railway, or canal, or any other works were projected which required parliamentary sanction, whose interests would be affected thereby, they had a right to be heard against the scheme which was the object of the bill, and the referees had decided, in accordance with former practice, that such persons were entitled to their *locus standi*. He would venture to submit that if any persons were to be heard for the bill, those whom he represented ought to be heard against it. Their case was, that they were about to have water-works forced upon them which they did not require, and that the measure propounded was one which would not benefit the town.

Mr. VERNON HARCOURT, in answer to his friend, would again impress upon their lordships the fact that the petition did not represent any individual injury, as likely to arise to the petitioners by the passing of the bill, and that, therefore, under the rules of the House of Commons they were not entitled to be heard.

Their lordships ordered the room to be cleared whilst they considered the point, and on the readmission of the public the chairman said the committee had decided that the petitioners had a *locus standi*.

Mr. *Yarde Eastley*, examined by Mr. CLARKE.

I am a solicitor, residing at Paignton, and also steward of that manor. I am also a member of the Board of Health. Paignton is about three miles from Torquay. The population at the last census was 3800; and it is a locality very much increasing in its population. There is a great deal of building going on at present there. Our supply of water is not good for domestic purposes. The town is partly now supplied by wells, which are in proximity to privies and cesspools. There is also the town leet or lake, that runs down from high ground, through the town, and thence to a mill-pond. The public supply is at present from Paignton well, the water of which is pure, as it oozes from the rock. It is taken from thence in pails by the people, and carried to their houses. Cattle drink at one portion of the well. We have no mode of extinguishing a fire, if one should unhappily occur, except by carrying water from the wells. It is intended by the bill to preserve the power to the people of getting water at Paignton well as at the present time. The local board have petitioned in favour of the bill, on the ground that it will be of great advantage to the town. It is proposed to incorporate a company to give the supply. I never understood there will be any rate levied upon the inhabitants; it will be optional on the part of the public whether they support the company or not.

Cross-examined by Mr. WRENFORDSLEY: We generally use soft water at our house, as the water from my well is found to be brackish. At the town well there is a place where the inhabitants get water; and there is another division, where the cattle drink. They are distinct places, but the water afterwards unites and forms a common stream, which runs into the sea. The wells in the parish of Paignton contain good water. It was at a general meeting of the local board when it was agreed to petition in favour of the bill. Nine members attended, and five, I believe, signed the petition.

Re-examined by Mr. CLARKE: The statutory number signed it. There are 20 members of the board, and eight or nine of them are favourable to the scheme.

By the COMMITTEE: There had been no notice given that the question of water supply was to be considered at the meeting of the local board, but notice had been given that it was intended to present the bill.

Mr. *J. F. Belfield*, examined by Mr. CLARKE.

I am a magistrate, and chairman of the local board. The supply of water at present at Paignton is not good. I concur with Mr. Eastley that the town is growing in importance. There is a prospect of a great many houses being soon built there. I am a promoter of the scheme. The other gentlemen are either resident in Paignton or have property there. The water in the town lake, or the higher stream, is unfit for domestic supply. The stench from it in summer is intolerable. Sewage runs into it, it is fouled by cattle, and runs in an open ditch, which is open to all sorts of contamination. The water in the Paignton well is good, and there is plenty of it. I have heard that alarm has been expressed that the bill would deprive persons from the liberty of filling their pails at the well as at present. It is the intention of the promoters to give the public, free of charge, a plentiful supply of water there, and in summer time a supply which will always be pure. We propose also to give them a drinking-place at Cross. The local board met on Monday last. There had been a good deal of discussion and consideration as to the proposed bill for several weeks previously. It was an ordinary meeting, and called as usual. There cannot be any question as to the absolute necessity of a better water supply being had for Paignton, especially to meet the requirements which must naturally arise from the great increase of buildings there. During the winter season the water in the well may be taken to be pure; in summer there is a mixture of fresh and foul water, and consequently it is impure. It is proposed to convert the mill pond into a reservoir. I am the owner of the mill, and that pond I consider to be a nuisance altogether.

Cross-examined by Mr. WRENFORDSLEY: I am a landowner. There have been built, or are building, upwards of 100 houses on my land. I am a director of the proposed company. I have agreed to sell the mill and the pond to the company for a certain sum.

Re-examined by Mr. CLARKE: There has never been any idea entertained as to charging a water-rate upon the inhabitants.

By the COMMITTEE: The scheme will not interfere with the supply of water to the town well. It will be equal in quantity, and better in quality decidedly. It is intended that the public should have the first user of the water, and the residue we intend to go into our reservoir.

Mr. *J. J. Goodrich*, examined by Mr. CLARKE.

I am a surgeon, residing at Paignton, and one of the directors of the new company. I concur with the previous witnesses that a better supply of water is required there. It will be a great advantage to carry the water to the town in a pure state, and it will be a great sanitary improvement to get rid of the mill pond. There are dead dogs and cats often floating in it. I am a member of the local board, and was present at a meeting of the inhabitants of Paignton, Mr. Tozer being in the chair. There were all sorts of people there, and it was such a meeting that I never saw before. It had been represented by some parties that there would be a public water-rate levied, and that the water was to be taken away from the poor people without giving them any compensation. I wanted to explain matters to the contrary at the meeting, and to read a letter, but they would not hear me. The petition in favour of the bill contains the names of the clergy and all gentry; and most of the tradesmen of the town have promised their support. There is a petition in opposition to the scheme, the first names that graced it being those of Lady Julia Lockwood and Mr. Lockwood. Their residence is quite a mile from the well, and they cannot be affected personally in the supply from it. All the principal owners of property have signed in favour of the scheme, which will be the greatest sanitary measure, if carried out, that I have ever known. The town lake, where it runs through the town, is a great nuisance. There are privies erected over it, and the smell in summer is most disagreeable

Mr. *W. Froude*, examined by Mr. CLARKE.

I am a magistrate of Devon, and lately a civil engineer. I reside at Paignton, and am one of the promoters of the scheme. I take an interest in it solely with a desire to benefit the inhabitants of the town. The supply of water to Paignton is at present very impure. I do not believe the proposed bill will at all affect the harbour or the water-scour at the pier.

Cross-examined by Mr. WRENFORDSLEY: I do not know whether there has been any representation made by the Harbour Commissioners to the Board of Trade. There is a place called Cross at which the water is used for public purposes, and we do not intend to close that up by the bill.

Mr. *Lidstone*, examined by Mr. CLARKE.

I am clerk to the local board of Paignton, and live near the town leet. It is a great nuisance. A large majority of the board, I believe, are in favour of the scheme. There are but three opponents to the bill. The owners of property generally are known to be in favour of the scheme. Many of the persons who have signed the petition against the bill reside at Preston—about a mile distant. There has been a representation made that the people there would be rated; such will not be the case.

Cross-examined by Mr. WRENFORDSLEY: Preston is part of the parish of Paignton. Some of the petitioners are landowners residing there.

Mr. *H. Murch*, examined by Mr. CLARKE.

I am surveyor to the local board, and I concur with the previous witnesses in saying that the streams that flow through the parish, as well as the mill pond are a perfect nuisance. The proposed bill will, if carried out, give a plentiful supply, and will not prevent the people from taking the water from the well with their pails, as usual. There will be a tank erected over the well.

By the COMMITTEE: We have commenced a system of sewage at Paignton. The drains are flushed now by water from the mill pond, which is obtained by consent.

R. P. Grierton, Esq., examined by Mr. CLARKE.

I am a civil engineer, and am engaged to supply the town with water. At the weir at Goodrington, or head of leet, the water is good. I propose to put a 6-inch pipe there, and convey it to a reservoir, which will hold about 270,000 gallons. The water will then be carried to the inhabitants through service-pipes, the reservoir being sufficiently high to supply the whole of the town. I do not intend to deal with the town lake in any way. The mill leet at the present time runs into the mill pond, and is a nuisance. It will be covered over by the reservoir. The water which we shall distribute from our reservoir, after it has been used for domestic purposes, will be taken into the sewers, and flow into the harbour as usual. In the place of the open well I propose to construct a tank, from which the inhabitants can take what water they want, as usual. The surplus water from this will run into another reservoir, and this will supply a low-lying portion of the town. I propose to give, both at Paignton and at Cross, an ample supply of water for the public use. The cost of the works, including parliamentary plans, and so on, will be about £10,500. The capital of the company is to be £15,000. There is no other water coming to the town, except the springs in question.

Cross-examined by Mr. WRENFORDSLEY: I know the district tolerably well. There are no other copious springs from which a supply could be obtained. The minimum quantity of water at Goodrington, at its lowest, has been gauged at 175 gallons per head of the present population.

Re-examined by Mr. CLARKE: Should the local board require more drinking places in the town we shall be able to give them, as also a plentiful supply of water for the purpose of flushing their sewers. We provide filtering arrangements.

Mr. *G. Bridgman*, examined by Mr. CLARKE.

I am a surveyor of Paignton, and have assisted in the scheme. I concur with the last witness in his evidence as to the course of the stream. Nearly as much water will go down to the harbour hereafter as at present. Of course it will be diminished by the quantity that may be used for watering the streets.

This was the promoters case.

Mr. WRENFORDSLEY, with the permission of their lordships, proposed to call witnesses before he addressed the committee against the bill.

Mr. *Tozer*, examined by Mr. WRENFORDSLEY.

I reside at Paignton, and am secretary to the Harbour Commissioners. There are six open drinking places in the parish, from the source in one spot or the other. The sixth is at the mill pond. I am owner of several houses, and the water passes by them. I never heard of any complaints from the in-

habitants as to the water. The privies have mostly been removed, and the water, though certainly not quite pure, is much improved by the operations carried out by the local board. I have flushed the sewers from the town lake, and have not seen any difficulty in the case of fire. We now get as much water as we want, and free of charge. I consider it of the greatest importance to the harbour that the stream should not be closed. If the water was taken away the harbour would be almost useless, and would be filled with sand. The Harbour Commissioners have presented a petition to the Board of Trade in respect to the present bill, and I have had an interview with Sir Stafford Northcote, to whom I represented that we could not spare a drop of water. The water is of use to the pier, but I cannot say what use it is to the marsh land near to the harbour. There is not a place from the port of Plymouth to Exmouth that is better supplied with water than Paignton. There is plenty of spring water in the well, and more could be obtained by sinking, if necessary. There was a public meeting called in respect to the bill, and, of the 300 persons who attended it, all were opposed to the bill.

Cross-examined by Mr. CLARKE: Three of the local board are promoters of the scheme. My objections are that what water we have had previously we are to be deprived of, and that as the principal stream comes through my property, the company are going to sell what they have no right to; that the scheme is unnecessary; and that if more water is wanted, it can be obtained by sinking wells of moderate depth. I am a preacher at a chapel in Paignton, and would like to preach to the learned counsel if he had no objection. There are no powers in the bill for charging the people with a water-rate.

By the COMMITTEE: There was a copy of petition sent by the harbour company to the Board of Trade. The Board of Trade sent an inspector, and that gentleman reported accordingly.

Mr. CLARKE read the report.

Mr. VERNON HARCOURT said that the Board of Trade had stated that they never sent evidence before committees of either House.

The COMMITTEE said it was essential that they should know how the report originated.

Examination continued: I cannot say who gave the information that it was part of the scheme to divert the water out of the harbour. We have no water at present to flush the new sewers. The old sewers have been flushed at times when I was surveyor, by the water from the mill pond. We shall have to pay for the water to flush the new sewers; that is, if the bill is passed. The cost will not only come out of the pockets of the Board of Trade, but out of mine also.

Mr. WRENFORDSLEY said, in respect to the report, that it was sent to the Board of Trade by the coastguard people stationed near the harbour.

MONDAY, MARCH 18.

Captain *Burney*, examined by Mr. WRENFORDSLEY.

I am a commander in the Royal Navy, and have been in the service for 42 years. I was formerly commander of the coastguard station. I know the harbour at Paignton perfectly well. It was my duty to visit it every day. The depth of the harbour is about 15 feet. I know the stream inland. If that was stopped, sand most likely would accumulate in the harbour. The harbour is sand and mud combined. Any tampering with the stream would, in my opinion, be detrimental to the town and harbour of Paignton. I reside there, and am satisfied with the water which I get from my well. I believe the town is at present well supplied with water. I know that Rear-Admiral Sherringham was instructed to make a report to the Board of Trade. I have no interest in the harbour, and am merely a resident there. I have reported as well to the Board of Trade.

Cross-examined by Mr. CLARKE: Admiral Sherringham is one of the petitioners in favour of the bill. I am decidedly of opinion that if the water which now flushes the harbour is taken away, it will be injurious to the harbour.

Captain *Walker*, examined by Mr. WRENFORDSLEY.

I am a retired captain in the Royal Navy. I have held various positions since 1806. From my knowledge of Paignton Harbour, I agree with the last witness that the stoppage of the stream would be injurious to the harbour. I have no interest whatever in the bill, but was merely asked to walk up here.

Mr. VERNON HARCOURT: Then I wish you had had a better day, captain.

Mr. *Price*, examined by Mr. WRENFORDSLEY.

I reside in the parish of Paignton, and am one of the churchwardens. My father is a landowner there. I am well acquainted with the water supply of that town. That which we get from the wells is good, and that from the stream I consider to be fit for culinary purposes. I am a shareholder in the harbour company. If the stream in question was interfered with, the harbour would be deteriorated. The supply of water would be lessened to the pier if the water-works were constructed, and in course of time the harbour would be filled up with sand and mud. I have no other interest than that of a shareholder in the harbour company.

Cross-examined by Mr. CLARKE: The Goodrington stream rises in our property, which lies in the valley. All we want is the water to the pier. I heard Mr. Goodrich, in his evidence, say that the town stream in summer was a nuisance. I have never detected any nuisance myself. It is true I live away from it quite a mile and a half. Fish and potatoes might be boiled in the water of the stream, but I do not think I should like to drink it. The town of Paignton is in the valley. It is not shown how the water, when once it gets into the valley, will get out again without going down the harbour. The present bill is an amended one. I do not see a clause that I formerly objected to, which had reference to the supply of water to the houses belonging to Mr. Belfield. If the works are constructed in the way proposed, all the water that will be used by the inhabitants will go into the sea instead of into the harbour.

Mr. *William King* examined by Mr. WRENFORDSLEY.

I am a builder, and reside at Paignton, where I own six houses. There is an ample supply of water in the town. The water in Paignton well I consider to be very good. It is used by the inhabitants, and also for watering gardens and wetting lime. The town is also supplied with a stream that runs into it. The water of this is fit for culinary purposes, but not for drinking. There are three or four drinking places in the parish, but I cannot say exactly. The local board have recently put down some pipes for sewage purposes. We have had several fires there, and always had water sufficient for the extinguishing of them. There is no difficulty in finding water by wells. I have had 50 years experience. I have wells on my property, and have never heard any complaints against the water which is obtained from them.

Examined by Mr. VERNON HARCOURT: I believe that if the bill is passed the water will be taken away from the Paignton well, which is much used by the inhabitants. I am a brother-in-law of Mr. Tozer's, but that does not signify. I did not speak at the public meeting.

Mr. WRENFORDSLEY here proposed to read a letter which had been sent by Mr. Goodbehere, on the part of the promoters, to Mr. Francis Baker, the local solicitor for the petitioners against the bill, who was absent on the occasion.

Mr. VERNON HARCOURT objected, and said that Mr. Barker, if the letter was to be read, ought to be placed in the witness-box, in order that he might be cross-examined.

The committee decided not to allow the letter to be read.

Mr. WRENFORDSLEY then addressed their lordships on behalf of the petitioners, confining his observations, first of all, to the preamble of the bill, which started, he said, with two propositions in reference to the advantage which a system of water-works would confer on the townspeople generally. The preamble stated that the promoters by their scheme sought to give to the town a supply of good and pure water, which was so much wanted, both for sanitary and domestic purposes, as well as for the extinguishing of fires. This was what he believed to be the question with which the committee had to deal. Now the evidence went to show that the town was at present supplied with water from two sources. In the first instance, there was a stream above the town, the quantity or quality of which he would not allued to just then; but it was a stream which ran above the town, and furnished a supply to the inhabitants at present living in the higher part of the parish. The second source which the people of Paignton had was the wells, and their third supply came from the Paignton well. It would not be his intention to endeavour to prove that the water in the upper stream was pure, but the committee would remember that, according to the evidence of Mr. Eastley, it was good for sanitary purposes. As to the water in the town leet, Mr. Grierton, the engineer for the bill, than whom he could scarcely have a more adverse witness, also said that the water was good; his evidence was that he never smelt anything disagreeable in it, and that he considered it to be good water for the purpose. That proved beyond all controversy that the water in the leet was good, and that the supply was such as the inhabitants approved of.

Mr. VERNON HARCOURT: That is the same supply. We say the water in the leet is bad when it comes through the town, but we do not say it is so above the town.

Mr. WRENFORDSLEY: Well, above the town there was undoubtedly a good and sufficient supply of water for culinary and sanitary purposes; and there were no allegations on the part of the promoters that the water was in any way injured except by exposure. The second supply was, as he had observed, by wells. Now, as to that he would call the attention of their lordships to the evidence that had been given on that point. Mr. King a builder of many years experience, had sworn that the water from the wells was good, and of sufficient supply. He was the owner of house property, a man of 52 years experience, and he had told the committee that water could be easily obtained from the wells, and that the water, when obtained, was good for domestic consumption. No complaints, he said, were made by his tenants, and he saw no reason to alter his opinion, or to differ with that given by Mr. Tozer, his brother-in-law, against whom some uncalled-for allusion, about his being a preacher at a chapel, had been made. The third supply was that given by the Paignton well; and upon that supply he would have to weary their lordships with a few observations, both as to the quality or quantity of water in that well. Mr. Eastley said that the water was pure, and that it sprang from a rock. It was impossible for any witness to be more sincere than Mr. Eastley was, and he admitted that that portion of the well which was used by the poorer people of Paignton for domestic purposes was pure and good. He admitted that the well was divided into two portions or sections—one was used by the inhabitants, the other by cattle that went there to drink. Nothing could be more satisfactory than that, as by that division the water could not be contaminated. The evidence, too, of Mr. Belfield was important, and he was one of the promoters of the bill. Mr. Belfield said that he was the owner of property in Paignton, and was necessarily well acquainted with the place. And what was his evidence as to the water in the Paignton well? He said that water was good, and that there was plenty of it—that it was abundant. If so, how was it, then, that the promoters had suggested a scheme by saying there was no sufficient supply of water whatever in the town of Paignton, and that the preamble was in this respect proved? Mr. Tozer had said that the water in the well was pure and good, and the only fault to be found against Mr. Tozer, after all, was that he had been a little too zealous in his interview with the Board of Trade; and surely, when the evidence of Mr. Tozer and the other witnesses who had been called on behalf of the petitioners was corroborated by adverse witnesses, he (the learned counsel) was entitled to belief when he contended that it was true that the water was pure and good, and sufficient for all purposes required.

Mr. VERNON HARCOURT: That is the very foundation of our case. We admit that the water in the Paignton well is good, and from that well we propose to give our supply.

Mr. WRENFORDSLEY was there to oppose the bill, not upon the clauses, but as to the preamble. The next point in the evidence was as to the details of the supply—the engineering part of the scheme; and he would draw the attention of the committee to the absence of information in respect to that, for it did not appear that the committee had been furnished with any description whatever. Mr. Grierton had said that the service reservoir was to be by the Paignton well, but he had not given any evidence to show that an increased supply of water was likely to be obtained elsewhere.

Mr. CLARKE: There are two sources from which we propose to obtain a supply—one from the upper part of the town lake and the other from the Paignton well. Now, as to sanitary measures, he (the learned counsel) did not find that Paignton was an unhealthy town at all—there had been no cholera there, and it was a place to which people were likely to go to reside in future. If that was the case, it certainly did not appear that a better supply of water was so urgently needed for sanitary purposes. Admitting, as the promoters of this bill would attempt to show, and as the witnesses had done, that the water in the Paignton well was pure and good, and that the public had a perfect right to it, it was clear that the endeavour to take away a user from them which they had enjoyed for a very large number of years was not likely to be justified by the result. His learned friends knew perfectly well the value of that word user; it actually gave the town people an easement in the water, and it would therefore be a wrong act to take it away from them.

Mr. VERNON HARCOURT: We admit the user. My friend need not trouble himself further as to that.

Mr. WRENFORDSLEY: Then that went to prove his case, that they were going to deprive the people of a user they had long enjoyed, and that the promoters had no provision which would enable them to give them a recompense instead, for the only benefit they would give the town would be the use of the water for the flushing of the sewers and the extinguishing of fires. Again, the engineer had said they had made no arrangement as to sewage, or as to the engineering details by which the supply of water was to be given.

Mr. VERNON HARCOURT: There was no arrangement as to terms. His friend must have misunderstood the answer.

Mr. WRENFORDSLEY: The bill said that such and such arrangements would be made. It was in evidence that the inhabitants had their supply of water at present free of cost, whereas, if the bill was passed, their lordships would compel them to treat with a company for what water they might require, and the company, in fact, might charge them just what they liked for it. Where else were the poor to look for that public benefit which the company were going to take from them? Then, again, as to the taking away of the surface water, which flowed over farm lands in the direction of the harbour, Mr. Grierton, the engineer, had said that compensation would have to be made to the owners of the soil, if the water was taken away—it must be compensation for the loss which those people had long enjoyed. He had ventured to look into the practice of the other House, and to see how far such a question would be considered.

The CHAIRMAN: There are no referees in this House. We have already decided in your favour on the question of *locus standi*.

Mr. WRENFORDSLEY would pass on to the drinking places. Mr. Tozer had proved that already there were as many as six in the parish, and that there was no difficulty in the people taking as much water as they chose from them. Mr. Grierton, in his evidence, said that provision would be made at Cross and at the Paignton well only in future—that the public were to have two places instead of six. This the learned gentleman contended would be an infraction of their rights. The next point which he would trouble the committee with was the damage that was likely to arise from the stoppage of the stream that now found its way into and flushed Paignton Harbour. The committee could not have witnesses of a higher character than the gentlemen who had been examined that morning, and they said beyond all doubt that the harbour would be injured if the flushing water was taken away from it. It was Admiral Sherringham who made the report to the Board of Trade, and in respect to this gentleman it had been claimed by his learned friends on the other side that the admiral was one who had signed the petition in favour of the bill. Assuming, then, that the admiral did make a report to the Board of Trade, it was fair to suppose that the report was an unfavourable one as far as the injury to the harbour was concerned. It seemed, however, that if he made a favourable report the board did not believe him, and if he made an unfavourable one, it was a very extraordinary thing that Admiral Sherringham should have signed a petition in favour of the bill. It was, however, evidently not a report got up hastily, but a report that had been well considered, and it described the damage that would be done to the harbour if the scheme propounded was allowed to pass. In conclusion, the learned gentleman said that the bill would most likely not have come into existence had it not been for Mr. Belfield and others, the owners of house property in Paignton, where extensive building operation of theirs most likely would soon be going on. The evidence of those gentlemen, especially that of Mr. Belfield, was not to his mind at all satisfactory, as he proposed to benefit his own property by sacrificing rights and privileges which undoubtedly belonged to the inhabitants at large. It was intended to deprive the people of that user in the water which they had so long enjoyed, and to compel them to take their water through a company, who might charge them just what they chose for it, and this he submitted was quite enough to move the indignation of any community. If bills of this kind were allowed to pass, there would be no limit to them, and every village in the kingdom would be saddled with a company. Paignton at present was well and sufficiently supplied with water, and nothing more than this was desired, and upon the broad principle of public right as against public grievance he said that so far as the preamble of the bill was concerned it had not been proved.

The CHAIRMAN said the committee did not think it necessary that the council for the promoters should address them, as they had decided to give the bill. Had Mr. Wrenfordsley any clauses to propose?

Mr. WRENFORDSLEY said the petitioners wanted a drinking place at Winner Street.

Mr. VERNON HARCOURT said there were two drinking places above the source from which the promoters proposed to take the water.

Mr. WRENFORDSLEY said it was important that another should be added at Winner Street.

Mr. VERNON HARCOURT said that the committee had no legal power to order a drinking place there.

The CHAIRMAN inquired why?

Mr. VERNON HARCOURT said that that would be a power extending beyond the notice of the bill, and therefore their lordships could not give it. He was informed that the promoters did not intend touching the present drinking place at Winner Street; in short, that it would not be closed.

The preamble of the bill was then passed.

REDHILL AND WARWICK TOWN WATER BILL.

WEDNESDAY, MARCH 13.

Mr. LOCH appeared for the promoters of the bill; Mr. ASPINALL, on behalf of the trustees of the Idiot Asylum; and Mr. STEPHENS, for the Caterham Spring Water Company.

Mr. LOCH said this bill was promoted by gentlemen resident in the parish of Reigate, who had become impatient with the state of things as at present existing in that neighbourhood with respect to the supply of water, and who were desirous of introducing a system which would give the inhabitants a supply both for domestic and sanitary purposes. The parish of Reigate was divided into two portions—there was the old portion or borough, and another portion called the "foreign," which name was derived, no doubt, from the fact that, in days gone by, in was inhabited by strangers, or those who did not choose to reside within the borough; and it was with a view to supply this district, or division, with water that powers were sought for by the bill. The greater portion of the people, whom he would call the "foreigners," resided near the railway station, and the town that had grown up there was called Warwick Town, the population of which had of late rapidly increased. In 1851, the number of persons residing there was 3269; in 1861, the population had increased to 7966; so that within the ten years it had more than doubled, and it was expected that it would continue to increase in the same ratio as it had done. The place was occupied by persons in different positions in life. The principal thoroughfares had a good class of houses, which were inhabited by tradesmen, while in the lower or remote parts of the town were the dwellings of labouring people. In the vicinity were houses of a better class, and they were principally inhabited by the families of merchants and others from London. It would seem that these houses were entirely dependent for their water supply on wells, or tanks made to receive the rain water, while the poorer classes were left without any supply at all, except that which they obtained from a brook which received the sewage of the town, so that the water was of the worst possible kind, being polluted in every way that water possibly could be polluted in a running stream. The promoters of this bill asked for powers to establish works higher up the brook, and the report of the engineers, Messrs. Richardson of Westminster, was most favourable as to the quantity and quality of that water in all seasons of the year. The corporation of the town had determined recently to carry out an extensive system of drainage, but at present there were no means of flushing the drains when completed, and it was with the view also of supplying water for this purpose that the present bill was promoted. The scheme in its entirety was a very simple one, and would be most economically carried out, the estimated cost being only £14,000. The company, it is true, asked for powers to raise £20,000 with a view to contingencies, but at present they conceived that £14,000 would be ample for all the purposes required. Against the bill there were four petitioners. The first of those petitions was from the South-Eastern Railway Company, but that related only to a question of clause, and arrangements would be made by which the opposition of the company would be withdrawn. The next petition was from the trustees of the Idiot Asylum, a petition no doubt deserving the utmost consideration. The Idiot Asylum was established in 1862, and by royal charter the trustees became owners of an estate of about 140 acres, upon which buildings were erected for the reception of some 600 of unfortunate people; the premises cost upwards of £100,000, and the supply of water to them was obtained from the brook mentioned in this scheme. In the first place he would say that the trustees of the asylum had acquired no more right to the stream than any other riparian owners might do; and it might become a question whether those living lower down the stream had not a right to complain of the water being abstracted if they thought fit to do so. However, the weight of importance to be attached to the petition might be measured in this way—the number of inmates at present was about 600, and this number probably would be increased to 700, and these would depend for their supply of water upon the stream. Giving them, then, the liberal allowance of 20 gallons each per day, the consumption would amount to 14,000 gallons, leaving a very large margin, many millions of gallons, for the use of the inhabitants of the town. In addition to this, the promoters said that the point from which the institution took in its water from the brook, was a point where the sewage ran into it, and so the water was in a filthy condition, so filthy, indeed, that it could not be used until it was pumped into a filtering apparatus at a distance of some 1000 feet. Now his clients were willing to do two things in their amended bill—they would accept of half the stream, leaving the rest for the wants of the asylum; and, in the second place, they would agree to submit the matter to arbitration, by which the quantity to be supplied might be determined. The third petition was from certain owners and occupiers of property at Redhill, but it did not call for any observations; and the fourth was that of the Caterham Spring Water Company, who were represented by counsel on that occasion. In dealing with this petition, it would be necessary for him to detail the circumstances under which that company appeared in opposition to the bill. The Caterham Spring Water Company was incorporated in June, 1862, and it embraced a considerable area of country over which it was proposed to extend its mains. By the Act, the period of five years was allowed the company to construct the whole of their works, and after the expiration of that time their powers of extension were to cease. Now, in the area contemplated by that company was the parish of Reigate, which was situate at a distance of eight miles from Caterham, and they naturally expected that the company would completely and speedily carry out its intentions. However, in the first instance, the company gave their attention, as they were naturally expected to do, to Caterham, where their works were constructed; but from that time to the present they had taken no steps to supply Reigate with water, and, consequently, great dissatisfaction existed at the position which they had assumed, and to which they were not justified as far as Reigate and the district were concerned. This state of things went on for some time, until about three years ago, when it became desirable that the Redhill Gas Company should take in an additional district, and as they were coming to Parliament for that purpose, it was suggested that clauses should be inserted in their bill giving them power to supply the district with water as well as with gas. This step at once raised a spirit of opposition on the part of the Caterham Company, and they intimated that, unless the clauses as to water were struck out, they would oppose the bill in committee. A deputation from both companies met, when a pledge was given on behalf of the Caterham Company to the effect that they would carry out their scheme, and upon this the clauses were withdrawn from the Redhill Gas Company's bill, they (the company) believing they had induced the Caterham Company to do that for which they had become incorporated—at least, that they would give their attention to fulfilling that which it was their duty to fulfil, and that they would give to Redhill and the district that supply of water which was so much desired. This was in 1865, but from that time to the present no steps had been taken by the Caterham Company to carry out their pledge; nothing whatever had been done towards constructing their works, and they had failed, as he had said, to fulfil their obligation, with this exception, that on Friday, the 8th inst., they sent down some pipes, and dug trenches to place them in, evidently with the colourable pretext of being able to come before their lordships and say that their project was being carried out. By their Act, however, they were prohibited from carrying on their works after the lapse of five years from the date of their incorporation; and, as the five years would expire in June next, it would be almost an impossibility for them to do what once they had contemplated, for, besides the erection of works, they would have to lay down pipes for a distance of eight miles, and to construct a reservoir at Bletchingley, which was about midway between the two places.

Mr. STEPHENS said his learned friend had been misinformed as to what had been done by the Caterham Company.

Mr. LOCH said his instructions were that the pipes were put down at the wrong place; the position in which they had been left was different from all usual custom, and they had been left evidently with a view of affording a colourable pretext to the company to appear and state before their lordships that their intentions were *bonâ fide*, and would be fulfilled as they ought to be.

Mr. *Aiken*, examined by Mr. LOCH.

I reside at Reigate, and am the sanitary inspector there. I have had my attention constantly called to the supply of water in that borough. Water is very much required there. I know of no person inhabiting a house who receives a supply of water from the stream in question. The water of the stream at present is really not fit for consumption when it gets into the town. I have never known the stream to be dry. The water is good, as far as I know. It is clear water higher up the stream, and I should not hesitate to drink it. The Idiot Asylum use the water, but it is rendered bad by the pollution of the sewage. There is a considerable population of persons—labourers and others—inhabiting cottages at Redhill, and there is a want of water in every respect. Either of the two schemes which are promoted would be beneficial to the town. I do not know of any steps being taken by the Caterham Company. They laid down a few pipes, it is true, about a week ago; but they have begun at the wrong end. They have placed them were they are more for show than utility.

Cross-examined by Mr. ASPINALL: I believe the inhabitants of the asylum

have some other water which they use for drinking. I have heard that the trustees have sunk artesian wells, and that they have failed in their object; still I believe they get sufficient water from these wells for drinking purposes. They spent a good deal of money in this respect, and the works there are considerable. The artesian wells and the brook are the only supplies they have that I am aware of. The water comes to the asylum after having passed the town as well as the gas-works. The site for the proposed reservoir is at a point on the stream where the water is pure. Assuming that the sewage continued to run into the stream, the water from the brook—supposing that one-half of the present supply was taken away—would be, of course, still more impure when it reached the asylum. There is a project for carrying away the sewage of the town in other ways.

By Mr. STEPHENS: My district, as inspector, extends to a little more than a quarter of a mile beyond the station. It goes to Merstham, but not into it. The sewage of Merstham does not run into that brook. There is no system of drainage in that village. There might be an isolated house or two from which the sewage might run. I do not know what operations have been taken by the Caterham people in the other direction. I do not know that eleven miles of pipes have been laid there. They have reported that arrangements have been made for carrying out their scheme; but I believe they have no money to do it.

Re-examined by Mr. LOCH: The prices set down for water in the bill are lower than they would be in the Caterham scheme. They must of necessity be lower, as a distance of eight miles would be avoided. A system of drainage at Redhill, I believe, has been determined on.

Mr. *Edward Lambert*, examined by Mr. LOCH.

I am an alderman of Reigate, and a director of the gas company. I recollect the clauses of the bill in respect to supplying the town with water as well as gas being struck out. It was owing to the Caterham people undertaking to supply the place with water. I can speak to the inadequacy of the present supply, and I conceive that, by the carrying out of the present scheme, we shall have a proper supply. I think it is the only chance we have. There are but few houses in the town that are supplied by wells. The corporation have entered into a contract for a complete drainage of the borough, and it is absolutely necessary we should have a plentiful supply of water to flush the drains. We propose to take the sewage on to a farm about a mile from the town.

Cross-examined by Mr. ASPINALL: I am one of the promoters of the present bill. I cannot say whether the proprietors of the Idiot Asylum were consulted before steps were taken. Our contract for the sewage works is not under parliamentary power at all. It is merely an Act of the corporation. At present the sewage of the town goes into the brook in question.

By Mr. STEPHENS: The bill of 1865 was withdrawn on an understanding between the gas company and the promoters of a bill for supplying the town with water. The sewage does not, to any extent, get into the stream before it reaches Warwick Town and Redhill. If the Caterham Company complete their system, they must do so before next June, if not, their powers will expire. I consider this the strongest inducement to them to complete their works. I am not able to state when the first application was made from Redhill to the Caterham Company to supply the town with water.

Re-examined by Mr. LOCH: Our drains are not yet constructed, and will not be complete within the next twelvemonth or two years. The water scheme might be carried out within that period.

Mr. *Stenning*, examined by Mr. LOCH.

I am a timber merchant of Redhill, and chairman of the gas company there. The clauses in the bill of 1865, as to water, were inserted owing to the Caterham Company failing to supply the town. Subsequently, communications were opened with that company, and in February, 1865, a deputation from each company met, when it was stated that the Caterham Company were incorporated for the purpose of supplying Reigate and the district with water, and that they intended to carry out all the powers they had obtained. The Redhill Company accepted this assurance, and the directors agreed to withdraw the water clauses from their bill. I cannot state positively as to the quantity of water in the brook. There are four or five sources of supply running into the stream. At its source the water is beautiful. The promoters intend to take the water from a point far above the part where the sewage enters it.

Cross-examined by Mr. STEPHENS: I might have had something to do in the first instance with the application that was made to the Caterham Company to supply Reigate with water. I signed the application feeling the need of a supply to the town. I am not aware whether I attended a public meeting in May, 1864, when a resolution was passed to the effect that an application should be made to that company. My impression is that the Reigate Gas Company afterwards, in their report to the shareholders, stated that they were going to Parliament for the purpose of getting a supply of water to the town. I cannot say whether the Caterham Company ever refused to supply Reigate with water. I am aware that they are bound to complete their works by the end of June next. I think the length of piping already laid in the road is about three-quarters of a mile. I do not know that any contracts have been entered into with the Caterham Company for the completion of their works within the prescribed time. I am auditor of the Caterham Company, and have audited their accounts, and I am a shareholder of the company. No notice was given publicly to the shareholders of the gas and water company as to the insertion of clauses for supplying Reigate with water before it was promoted in 1865. I am not aware that Merstham has any system of drainage, or whether other villages contribute sewage to the brook. I have not analyzed the water with a view of ascertaining whether it contains any sewage or not. Had the proposal of the Caterham Company been carried out after the conference I should not have promoted this bill. I thought at one time that they would carry out their pledge, and I took shares in their company under that belief.

Mr. *Bonny*, examined by Mr. LOCH.

I am the late inspector of nuisances at Redhill. I frequently found the great need of water in that town, especially to the poorer classes. There are several wells amongst the poor, but they are very impure, and the consumption of the water has caused much sickness. I know Merstham very well. At the top of the street in that village is a pond which frequently overflowed and became a nuisance, and in consequence of that a pipe was laid which carried the surface water into the brook. It is not sewage, and I think but very little of impure material gets into the brook.

Cross-examined by Mr. STEPHENS: There might be a little overflow of water down the pipe from the premises of a butcher near the pond, but it is nothing of consequence. I do not think the water in the brook is affected by it at all.

Mr. STEPHENS said, in order to save the time of the committee, he would admit that Redhill required an immediate supply of water; but he begged to state, on behalf of the Caterham Company, that they were in a position to carry out their undertaking, and that therefore there was no need whatever for the bill. The Caterham Company had got parliamentary powers to supply the borough with water, and they meant to supply it.

Mr. LOCH asked whether they would be in a condition to afford the necessary supply within the specified time.

Mr. STEPHENS said the best answer he could give was that if the company did not fulfil their obligations by June, they would lose all the parliamentary powers which they had obtained.

Dr. *Odling*, examined by Mr. LOCH.

I examined the water on the 6th of March, and found it bright and colourless and free from smell. On testing it analytically, I found a saline matter, usually discovered in chalk waters, consisting of carbonate of soda, and a very minute quantity of organic matter besides. There were 16 degrees of hardness in the water. It was a temporary hardness, and could be removed by boiling. I considered it good water for household consumption. Dr. Clarke's process for removing hardness is carried out by adding lime to the water, which acts upon the chalk contained, and which is deposited. The process is used by several companies with effect.

Cross-examined by Mr. ASPINALL: I only analyzed one sort of water. I had two samples, supposed to be from the same stream.

By Mr. STEPHENS: I did not take the water from the brook myself. I do not know the state of the brook, whether it was full of water or empty. I am of opinion that water containing sewage matter cannot be purified effectually. I agree with the report of the Royal Commission that deodorizing is not altogether effectual. If I had the choice of two waters to drink, one containing saline matter and the other none, I should certainly prefer the latter. If water contained sewage matter to a large extent, I should certainly not recommend it for the supply of a town.

Mr. *Baker*, of Tunbridge, examined by Mr. LOCH.

I am a filter-maker, and have given my attention to the question of water supply for a long period. I have examined the stream from which it is proposed to supply Redhill with water. I knew it perfectly well before, from having been employed in putting up works at the Idiot Asylum, and therefore I am capable of judging of its capabilities. I know the point from which it is proposed to take the water, which is about a quarter of a mile above Redhill. No sewage there pollutes it. There is no perfect system of drainage at Nutfield, nor at White Hill, at Merstham, or Gatton Park. The water at White Hill Merstham, rises out of the chalk. It is very beautiful water and clear, and there is abundance of it; one quarter of the water that runs down the brook would be sufficient for the wants of the population of the district. There are but very few persons residing between Merstham and Redhill. It is merely low-lying marshy land, and I have heard people complain generally of the want of water. They have to go after it in all directions.

Cross-examined by Mr. ASPINALL: It is very important that the asylum should have a good supply of water, and if anything a larger supply than other institutions. The unfortunate people confined there have no discrimination as to what they drink, and they require a large quantity of water for purposes of cleanliness. I have heard there are artesian wells at the asylum, but I have not seen them. No doubt they supply enough water for drinking purposes. For other purposes the occupiers of the asylum are dependent on the brook. The trustees have laid out considerable sums in pumping apparatus. I cannot say whether it has been as much as £2000. The water, as it is taken from the brook, is more or less impregnated with sewage. My filters generally improve it very much. I have always drunk the water for my own use.

By Mr. STEPHENS: I can make water which has sewage in it bright for a time. It may look and smell the same, but whether it is pure water I cannot decide. I agree with the report of the Royal Commission in 1864, to the effect that no efficient artificial method has been discovered to purify water for drinking and culinary purposes that has once been affected by town sewage; that by no known mechanical means can such water be made pure, as it is always liable to putrefy again, and that the process of deodorizing and filtration could only mitigate the evil. I agree with that report.

Re-examined by Mr. LOCH: It is impossible that the water in the brook can be affected by sewage matter. Such a report could not apply to the water we are dealing with. There were no houses at Merstham from which sewage could reach the stream.

Thomas Hursay, examined by Mr. LOCH.

I am a labourer, residing at Nutfield. I know the stream from which the company propose to take the water. I have never known it to be dry during forty years. There is always a considerable quantity of water passing down it.

Cross-examined by Mr. STEPHENS: There is a ditch behind the cesspool of my house, into which the sewage runs, and there is a stream running down the ditch into the brook. We can wash the privy out with the water from the ditch, and then send the dirty water down under the privy into the ditch, and so down the brook.

By the CHAIRMAN: We do this once in two or three weeks.

Re-examined by Mr. LOCH: The brook is half a mile from our house.

Mr. *Richardson*, examined by Mr. LOCH.

I assisted the company in laying out the scheme of these works. It was suggested that the stream should be the source of supply. I had previously satisfied myself as to its fitness for that purpose. I examined it on several occasions, and I did not notice that the water was polluted at all. I propose to establish a settling reservoir, to contain four or five days supply, and to allow of the settling of a very fine white sand, incidental to the chalk which I found in the water. The settling-pond is on Lord Monson's estate. His lordship has approved of the scheme. The water from this settling-pond I purpose to pump up to a reservoir, at an altitude of 110 feet, from which it will be supplied to the valley. There is also another reservoir, at a height of about 248 feet. By means of these two reservoirs, and the natural gravitation of the water, we shall be able to supply it to the upper stories of the houses in the district. The project, therefore, is a very simple one, and the estimated cost will be about £14,000. Supposing arrangements were made with the Idiot Asylum, that institution could be very adequately supplied from reservoir No. 2. I have not seen the works that have been commenced by the company at Caterham. There are about 200 yards of piping laid by them near Reigate, and there are other pipes laid along the ground in the parish of Nutfield. I have been told that the source of the Caterham supply is in that parish. I do not think they could complete their works by June next.

Cross-examined by Mr. STEPHENS: Excavating the settling-pond would not be a costly operation. There would be a cutting of about 11 feet in depth. I should say the maximum depth of the water in the brook is 2 feet. I have never seen the brook in a dry season. I estimate the cost of the settling-pond, or reservoir No. 1, at £550. The area in three-quarters of an acre. It will not be lined at the bottom or the sides. I propose to clean it by emptying out the water, and then the silt would be carted away on to the adjoining land. The sides will be supported by sloping. Reservoir No. 2 will hold 800,000 gallons. It will have brickwork at the bottom, and the cost I estimate at £1609. It is proposed by the company to adopt a system of filter-beds. I cannot say whether they are included in the bill. They

have been suggested since, and are included in the word "works." I should say the cost of filtration will be about £420. There is no system of filtration indicated on the plans, but it is exhibited in the estimate. As to the mode of filtering, I am entirely in the hands of the patentee.

By the CHAIRMAN: The cost is included in the £14,000.

By Mr. STEPHENS: We propose to begin with five or six filters, which are to be put on the lower ground, near to reservoir No. 2, which, like the rest, will be open. The cost of the six filters would be £420. Between the reservoirs Nos. 2 and 3 is a pumping-station, the cost of which I estimate at £870. There is another pumping-station which will cost about £1800. In this sum is included the engine, apparatus, &c. The cost of reservoir No. 3 will be £1496, without the piping. This and the small reservoir will be covered. The diameter of the pipe leading to No. 1 will be 8 inches; from thence to the pumping-station it will be 12 inches; and from thence to reservoir No. 2 the diameter will be 7 inches. The cost of the first will be £278, the second £998, and the third £1089. There will also be a fourth pipe of 5 inches diameter, at a cost of £367. The amount of land required will be about 4 acres, at a cost of £250 per acre. The land for the three stations together will cost about £2000. Besides the amounts I have given there will be the expense of the buildings, hydrants, cocks, &c. I think the entire estimate I have mentioned will be sufficient. One filter will pass 30,000 gallons per day. The amount of water per day which I propose to supply will be 300,000 gallons. I have not constructed individually any water-works on a large scale before.

Re-examined by Mr. LOCH: The sum total I have given is about £13,000. The 300,000 gallons is a much larger supply than will be required by 8000 people; 20 gallons per head per day is a large supply. The cleansing of the settling-pond, on the few occasions that will be required, can be effected without any great difficulty.

Mr. *Lees*, examined by Mr. LOCH.

I am a surveyor, and have heard the evidence given by the last witness. I am convinced that the works as proposed to be carried out by him will not exceed the sum mentioned. I have examined the brook, and find the water well adapted for the purpose. There is no sewage going into it from the village of Meratham. It is impossible for the filth from the privy of the cottages at Nutfield to get into the brook; they are situated at a distance of half a mile. I am one of the directors of the Redhill Gas Company. They despaired of getting the water from the Caterham Company, and it was in consequence of that, and the great need there was of water, that the gas company undertook to insert clauses in their bill to supply the neighbourhood with water. In Caterham the company already supply water, but nothing, with the exception of laying the pipes for a few hundred yards, has been done towards supplying Redhill. I have heard that they have purchased land at Bletchingley, which is midway, but I cannot speak positively about it.

Cross-examined by Mr. STEPHENS: I made an estimate in 1865 to supply Redhill with water at a cost of £2500, but the necessities are different now. I have not taken steps to ascertain what the Caterham Company are doing. I did take a share in the Caterham Company, but declined to follow it up. I cannot say what amount of support the company has obtained in Redhill. I have never heard of a contract being in force binding contractors to complete the Caterham scheme by the time specified—viz., June next.

This was the case for the promoters.

Mr. ASPINALL said that as arrangements were in contemplation, he should reserve his remarks, but would observe that the parties for whom he appeared admitted that a better supply of water was required for Redhill.

Dr. *Lancaster*, F.R.S., &c., examined by Mr. STEPHENS.

I have had considerable experience in the examination of water-works, and have tested very many different qualities of water. I have had submitted to me specimens of the two kinds of water which are before the committee this day. I have examined the water from the brook at Redhill and Warwick Town. I found it was clear and transparent; particles were to be seen floating in it by the naked eye. I collected these particles out of the two bottles, and placed them under a microscope, and they gave a variety of substances, such as fungi, living animalculæ, and microscopic animals in plants. The water must have been exposed to sewage of some kind, and in all respects it was objectionable for drinking purposes. The water that I examined was collected on Feb. 27, and the temperature then was 45°, consequently it was taken at a low temperature, and, therefore, was less likely to be impregnated with dangerous matter. Water which is considered to be pure for drinking purposes in the winter may be quite unfit for the purpose in summer. Some kinds of filtration may be effectual. I have examined water purporting to come from the company's works at Caterham, and found it a perfect specimen of what water ought to be. There was nothing in it but a few crystals of carbonate of lime. After standing for a few days I found a little deposit of that material, and that was just what I expected to find in water drawn from chalk. Chalky substances are certainly not impurities in the way that organic matters would be. The Caterham water was a wonderfully pure and good drinking water. I did not examine the Redhill water as to either its hardness or softness.

Cross-examined by Mr. LOCH: I tested two bottles of the Redhill water, and found both to be the same. I examined the sediment, and found the *débris* of both animals and plants, and the result was that it led me to believe that the water was exposed to sewage. Sewage may pass from cart-houses or from stables. I found no proof of human excrement in it. The offensive matter in the water might have been engendered by its passing through a farm, or where cattle had been. The end of February was unusually warm. The Caterham water, I should certainly say, had been filtered before it was submitted to me, because of its purity.

Re-examined by Mr. STEPHENS: The Caterham water had been softened by the lime process. I cannot say whether that water ever sees daylight till it gets to the consumer's house. I attribute the small deposit in it to the cleansing process of the water itself.

Dr. *Kendall*, examined by Mr. STEPHENS.

I have been for many years engaged in analyzing the properties of water, and have conducted many hundreds of experiments. I received samples of water to analyze in respect to this bill. The Redhill water I received from Mr. Hubbard on the 28th of February. It was said to have been collected at a point in the brook near to the proposed settling-pond. I found there was a considerable deposit in it—there was both animal and vegetable matter. There were 23½ grains of solid matter, of which 22 grains were mineral and 1½ grain organic matter. It had 13½° of hardness, and there was a small quantity of ammonia, showing a trace of sewage matter in it. I have drunk much worse water, but if I had my choice I should not drink the Redhill water. The temperature of the date at which it was collected was favourable to the water, and in warmer weather I should expect to find more animal matter. I examined also two samples of the Caterham water, taken from a tap at the Blacksmith's Arms, on the morning of the 4th of March. I found that it contained a small deposit of chalk crystals, such as I should have expected to find in water coming from such a district. The Caterham water was exposed to the process of Dr. Clarke, called the softening process. That process reduces hard water to soft, and it is a process I should like to see adopted by all the water companies in London, and it will, I dare say, be adopted in time. I saw Dr. Clarke's process in operation at the Caterham works five or six years ago. The black indications in the Redhill water I attribute to the presence of organic matter, vegetable, and animal. I should, perhaps, use the word sewage in the same sense as that used by Dr. Lancaster. Sewage, of course, would produce ammonia in water. Those results are left by Dr. Clarke's process. I do not consider the sediment in the Caterham water injurious, but quite otherwise. The mineral matter is 7½ grains in the gallon altogether. I know the water in Loch Katrine. I prefer the Caterham water to it. I certainly could not say the same of the Redhill water.

Cross-examined by Mr. LOCH: If the Redhill water had been subjected to Dr. Clarke's process, it would have made a difference. The test of the two waters was not made at all upon the same footing.

By the CHAIRMAN: I examined the Caterham water for the company before Dr. Clarke's process was introduced there. I know the works tolerably well.

Re-examined by Mr. STEPHENS: Dr. Clarke's process would not get rid of all the impurities, animal and vegetable, but it would reduce its hardness. It would not take out all the black deposit.

Mr. *Hubbard* deposed to taking water from the Redhill brook on the 27th of February, to sealing it up in bottles, and to taking the bottles to Dr. Kendall in the same condition as they were when sealed up. Witness also took two bottles of the same water to Dr. Lancaster.

Mr. *Drinkwater* said that he took the water from a pipe at the Blacksmiths Arms.

The CHAIRMAN said the committee would assume that the Caterham water was good.

Mr. STEPHENS said that this was all the evidence he intended to call as to the quality of the water, but he had other evidence to produce before the committee as to the general case.

THURSDAY, MARCH 14.

Mr. *Russum*, of Nutfield, was examined as to the course of the brook, and deposed that at some places there was direct communication and pollution of the stream, whilst at others, either through channels or by the natural course of drainage, pollutions found their way into the brook also. The water was quite unfit for drinking. The inhabitants near it would not use it for culinary purposes. There was a large stagnant bog at one place near it, the waters of which in summer-time were most impure, and these found their way into the brook. There was a yellow scum to be seen on one of the sources of the brook. Witness would not select the particular spot indicated for a settling-bed, nor would he use the water for the purpose of water-works.

Cross-examined by Mr. LOCH; The yellow scum arose from the stagnant water, and from sewage matter running into it.

Mr. *King*, farmer, of Nutfield, who had known the brook for a great number of years, corroborated this evidence. Several cottages communicated their sewage to his land, and sometimes the impregnated water found its way over his land into the stream. Considered the water in the brook most unfit for drinking purposes. In summer-time there was often not more than a foot of water. The stream was of varied width. In some places it was 8 or 10 feet wide. It was not a fast stream by any means. The land on its banks generally was boggy and marshy land.

Cross-examined by Mr. LOCH: There was peat in the soil.

Mr. *James Searle*, examined by Mr. STEPHENS.

I am a member of the Stock Exchange, and have been twice mayor of Reigate. I have always taken an active interest in the affairs of that borough, near to which I reside. I have always turned my attention to a better supply of water to the town, as well as a better class of dwellings for the working classes. I have belonged to different societies established for those objects. A well was sunk to the north of the station, as an experiment, some time ago, but we found the water so impregnated with iron that we could not use it. The brook, for a mile and a half, runs through boggy ground. If you cut the smallest trench in the bog, the exudations from either side fill it with discoloured water, which films over. The settling-pond is, in point of fact, to be excavated out of this very bog. A mere excavation in the bog, without the bog being lined, would, I should think, cause the water to be contaminated to a great extent. I should think that nothing could possibly be worse. I have been a member of the Market-House Committee. For the purpose of the house we sunk a well and lined it with brick, but the water after a time stunk abominably, and we could not use it. I am aware of an application being made by inhabitants of Redhill to the Caterham Company for water. The parties who got up the memorial, I believe, received a letter from the company, and in consequence of that, a public meeting was held in the market-hall, over which I presided. There was a resolution passed to the effect that the Caterham Spring Water Company should be requested to supply Redhill with water. The meeting pledged itself to take shares in the company, and to support it in every way. I and several other gentlemen took active steps to secure the supply. We went to Caterham, saw the works there, and obtained full information from the inhabitants as to the water, and we found they were perfectly satisfied with the water and the quantity supplied. From that time to the present we have supported the Caterham Company, believing they will carry out their obligations to the extent they promised. Shares were taken in the Caterham Company, but the process was interrupted some time afterwards by the Redhill Gas Company issuing a prospectus to the effect that they intended to introduce clauses into the bill for the supply of the district with water. This prospectus and the parliamentary announcements came upon me and the other residents with surprise. Negotiations were opened between the two companies, and several meetings were held. Neither side at first made any proposals. I then shortly stated the circumstances under which the Caterham Company were established to supply the district with water, and told the meeting that they meant to carry out what they had issued in their prospectus. The Caterham Company, I have no hesitation in saying, meant to go to Redhill with their pipes from the first, but no pledge was given as to the time when their works would be carried there. The Caterham Company, after the steps that were taken by the gas company, refused to listen to anything but the unconditional withdrawal of the water clauses, and the clauses were withdrawn accordingly, the Caterham Company undertaking to fulfil their obligations. Redhill was not the only part we intended to supply. It was the the terminal point for the large aqueduct. I can state that the Caterham Company never bound themselves to bring the water to Redhill by a specified time. I should not have joined the company had I not been anxious to bring the water there. The directors have never lost sight of their promise, and intend now, as they always did, to carry out their project. The directors, of whom I was chairman, were obliged to sink a second shaft at Caterham, which was a most expensive affair. We also found great difficulty in procuring a suitable site for the reservoir. We could not determine the size of our pipes until we knew

where the reservoir was to be, and in consequence of this we could not enter into any negotiations for the supply of those pipes. Negotiations were opened with several persons as to the purchase of land, but they were broken off though not from any *laches* on the part of the company. In 1865 our engineer was instructed to negotiate with contractors, and the secretary at the same time was directed to obtain an accurate plan of Redhill, with the view to giving the water supply to Redhill. The engineer was also instructed to obtain a site for a well to be sunk in order to supply Redhill, and in June of that year he reported accordingly. We had also great difficulty in procuring a proper contract for the supply of pipes. The pipes that are now on the road near Reigate were ordered a long time since. In March, 1866, we fixed upon the site of the reservoir at Bletchingley. Mr. Morrison, solicitor, one of the promoters of the present bill, then said he was very glad to hear it. There never has been a board up on the land at Bletchingley since we purchased it offering the land for sale. With regard to the contracts, I may say that on the 8th of August, 1866, the engineer was empowered to arrange with iron-masters for pipes for the supply of Redhill. The pipes now placed at Reigate were most assuredly ordered at that time, and for no other purpose than the supply of Redhill. The contract for the pipes was sealed in October, 1866. Requisite steps have also been taken for laying the pipes, and the contractors have undertaken to have those pipes in their proper places within three months from the date of the contract—the 2nd of February last. It is our intention, unquestionably, to have the pipes laid at Redhill before the expiration of our parliamentary powers. The apprehension in the minds of some people at Redhill, that the company will not complete their works before the expiration of their powers in June next, is quite unfounded. I, as chairman of the company, cannot see any difficulty why the contracts should not be properly carried out by that time. I cannot see the least necessity for the introduction of the present bill. There is not room for two companies in Redhill at the present time, certainly.

By the COMMITTEE: The water intended to be supplied by the new company was not to come from the wells in which the urine was found, but from a brook which, as is proved, is strangely impregnated with impure and dangerous matter.

Cross-examined by Mr. LOCH: The contract, which was sealed in October, 1866, specified the pipes that were required for the whole district of Redhill, as well as for the distance between the two places. We have about 25 miles of piping altogether, at a cost of £5000 or £6000. We have been advised by our engineer that the sum mentioned will cover the cost. The contract was conditional as to time, the contractors being bound to complete the works within three months. Part of the contract money is to be paid by shares of the company. We have not contracted as yet for the construction of the reservoir at Bletchingley. If the pipes are all in the ground by the 30th of June, and the reservoir at Bletchingley is not completed, we could supply Redhill with water notwithstanding, from our works at Caterham. We think the reservoir at Bletchingley would be a great convenience to the company as well as to the consumer, as the nearer it could be to the place whence the demand came, the better it would be in all respects. I did not join the Caterham Company until 1864. The time since then has been expended in making negotiations, and so forth, considerable difficulty being met with owing to the state of the money and iron markets; but nevertheless we have never lost sight of our obligations, from the first, as we felt bound to carry out everything contained in the prospectus. I have made it known constantly to the gentlemen at Redhill that we were progressing and taking steps towards bringing the supply of water there.

Re-examined by Mr. STEPHENS: The contract for the pipes was actually signed in October, 1866. The parliamentary notices for this bill appeared in November, 1866. There had been no notice given of it to the people at Redhill, to whom it came completely by surprise. In November, 1866, I wrote a letter in answer to one that appeared in the local paper, describing what we, as a company, were doing towards completing the works. I was not then aware of the parliamentary notice being given. I stated that an additional well was being sunk to a greater depth; that the land for the reservoir had been purchased; that the contract for the completion of the works had been undertaken by an eminent firm of contractors; and that it was the intention of the company to give a supply of water to Redhill and the district before the expiration of their powers in 1867. The Caterham works were originally constructed by a private gentleman. The object of the Act of 1862 was to purchase the works and incorporate a company. I cannot say anything as to the doings of the company before I joined them in 1864.

Mr. *Webb*, examined by Mr. STEPHENS.

I reside at the Manor House, Redhill, and know the district perfectly well. Immediately opposite the first settling-pond is my field. It is of a swampy character, and the further end of it is entirely boggy land. The water of the brook, as other witnesses have stated, is subject to a great deal of deposit. It is also much flooded at times, and my field this winter has been sometimes covered to the depth of 2 or 3 feet. There is a culvert which is not sufficient to carry off the water after the melting of snow on the hills. I do not consider the water good for drinking purposes. I always have to caution my mowers in the summer against drinking the water from the brook. I remember one man who drank it being seriously ill for some time afterwards. There is a bluish scum on the water at times. In the summer months I have known the water to be so low as not to be sufficient to turn a water-mill. In some places it has not been 2 inches deep. The water can only be used, after being filtered, for washing purposes. I consider the scheme of the present bill a mad one altogether. The water being insufficient, and certainly not good as to quality.

Cross-examined by Mr. LOCH: I do not hold any shares in the Caterham Company. I consider that the illness of the man I have mentioned was more to be attributed to the badness of the water than to the coldness of it. I do not attribute his illness to drinking cold water whilst in a hot state in the summer-time.

Mr. *Sendell*, examined by Mr. STEPHENS.

I am a butcher, and live in the village of Nutfield, near to the brook. The refuse water from my slaughter-house finds its way into the brook. There are 10 or 12 houses in my neighbourhood that also contribute to the stream.

By the COMMITTEE: The water in the main stream is certainly not fit for for drinking purposes.

Mr. *James Osborn*, examined by Mr. STEPHENS.

I was formerly a butcher and surveyor of Merstham. There are two heads of the local branch that run into the brook. Lord Hilton's house drains into the well-head of one of those branches, and then into the brook, and this I can positively speak to. About ten years ago there was an offensive drain running through the village, and we were compelled in consequence to put in a new drain, at a cost of about £100, from that drain to the brook, so as to run off the filth that accumulated from the houses. The whole of the filth of Merstham now runs into the brook. There are places in the vicinity of the brook towards Redhill in which sheep are washed, and the water and the rubbings from those places all go into the brook. I have seen dead cats and dogs in the brook, and only last week there was a dead sheep lying there. The brook passes near to the railway station, and naphtha and all the refuse runs into it. The water is certainly not fit for drinking purposes. I should say the majority of the people of Merstham do not use it.

Cross-examined by Mr. LOCH: The distance from Merstham to Redhill is about two miles. I know people are liable to a penalty for allowing filth to run into the brook.

Mr. *Daws*, examined by Mr. STEPHENS.

I am a farmer and plumber. I have been in the habit of flooding my land with water from the stream for many years past. As a plumber I have to repair water-closets, and at present I have 18 that drain into the brook. I have known the washings of sheep, when it has gone into the brook, to kill the fish. Lord Hilton's place drains into the brook.

Cross-examined by Mr. LOCH: One of the sources of the spring is from a chalky bed, and that yields beautiful water; but it passes into the farmyard of Lord Hilton, and leaves there the colour of porter or brown stout, and then it passes into the stream.

By the COMMITTEE: There is an inspector of nuisances at Merstham, and he is well satisfied with all that is thrown into the brook. I mean that we do not throw branches of trees or anything of that kind into it. The old water-courses have been there for a century, as I have been informed.

Mr. *Richardson*, grocer, regarded the water in the brook as quite unfit for drinking purposes, and corroborated the previous witnesses as to the state of the brook at Merstham.

Mr. *Homersham*, C.E., examined by Mr. STEPHENS.

I have had much experience in the construction of water-works in all parts of the kingdom. I am engineer to the Caterham Company. The works were made on the property of Mr. Drew, who established them for the supply of his estate, and then they were purchased by the company for the more general distribution of the water through the district, as persons would not build houses or reside there without it. When we obtained powers for Caterham we were ready to supply Redhill as soon as application was made by the inhabitants there, and capital was subscribed by them for that purpose. No application was made from Redhill till 1864, when the directors agreed to supply that district. A meeting was held at Redhill in May, 1864, when I explained the nature of the works, the quality of the water, and the advantages that would accrue by the introduction of the company's mains into that district. The meeting was satisfied with the explanations that were given, a resolution was passed, giving support to the Caterham Company, and new directors were elected. Of the four directors, three were resident, or belonged to Redhill. The shares in the company were going off satisfactorily till a local gas company at Redhill issued notice of their intention to apply to Parliament for powers to sink a well and to supply the town with water as well as with gas, when there was a sensible falling off in the support that was being given to the Caterham Company. The issuing of the notice was a surprise both to the shareholders and the public; confusion necessarily arose, and it was thought to be a pity that both companies should go to law and spend their capital in parliamentary and other expenses. I should say the bills of 1865 and 1867 were promoted by one and the same parties. The notice in 1865 undoubtedly interfered with the free going off of our shares. The opposition to the present bill also interfered much with our arrangements. I cannot say whether the Caterham Company made any terms with the Redhill people in 1865 as to the supply. If there had been I should have heard of them. I considered the scheme an impracticable one. As soon as the water clauses in the bill of that year were withdrawn, I took steps to carry out the original plans for taking the water through the district of Redhill. I had orders to commence immediately by sinking a new well, so as to afford an extension of the supply, and the sinking of this well, under the peculiar circumstances, took a considerable time to effect. Whilst this was being done, I surveyed the district between Caterham and Redhill, commenced negotiations as to the contracts, and so on. I advised the directors to construct a reservoir, and we had a great deal of trouble in securing land for that purpose; and the next thing was to forward the contracts for the pipes that were necessary for the distribution of the water. I advised the construction of the reservoir with a view to security, and to give greater accommodation to the inhabitants at Redhill, as the reservoir being replenished during the night would be able to afford any quantity that might be required with more rapidity during the day. At the present time we have about two miles of piping delivered, half a mile is in the course of delivery, and the remainder is being cast at the rate of half a mile per week, so that I anticipate the whole will be delivered within six or seven weeks, and the works completed by the beginning of June. I have no doubt that the Caterham water will be in Redhill by that time. We have the summer months before us, and we are straining every nerve to do so. Our shares are all now taken up, and I do not hesitate to say that if the parties who have opposed us had taken our shares, instead of spending their money in law, they would have had the Caterham water long before now. As to the scheme propounded by the bill, I should say that the brook from which it is proposed to get the water is one quite unfit for the purpose. The site of the proposed settling-pond is bad, and the fact of its being unlined would tend to pollute the water still more than it is. I should say that instead of costing £450, it would if properly constructed cost £2000 or £3000. The fact of not lining it is ridiculous. It ought to be made of hard material, and with the sides inclined, and so constructed that you could draw the filth towards the middle, and so get rid of it. The Caterham water passes from the wells in the chalk to the reservoir without coming in contact with the air, and afterwards it is submitted to Dr. Clarke's process before it is distributed to the public. Dr. Clarke's process is simply this:—A given quantity of saturated water is put into the reservoir, and into this is put the spring water, and the effect of this is that the quick lime seizes upon the carbonic acid of the bicarbonate of lime, and then the lime that was put into the water, and the chalk that was in solution, both fall down together. Dr. Clarke's process is intended more to soften water than to purify it. I agree with the witnesses as to living organic matter being found in the brook at Redhill. We at Caterham are on a hill 700 yards high, and our water is always bright and clear. The pressure we could give from Bletchingley would be something like 40 feet above the highest house at Redhill. I have no doubt as to the consequences of drinking impure water; we have had instances of it recently in the terrible affliction that visited London and other places. I consider the water in the Redhill brook is such that ought not to be distributed amongst the people residing there. I do not believe that a good supply could be obtained from it.

Cross-examined by Mr. LOCH: We draw about 220,000 gallons per day from our wells at Caterham, but we could supply a vast deal more, 1 million gallons per day, if it was required. The actual consumption does not at present exceed 16 gallons per head. The usual quantity of water that engineers now recommend Parliament to sanction is about that quantity per head per day, which I consider to be sufficient. We have not at present taken any means to extend our engine power. The water from Caterham to Redhill will have to pass through a pipe of 7 inches some part of the way. Starting

from Caterham, we have about a mile and a half of piping laid towards the direction of Redhill. About a week ago we commenced laying pipes near Redhill, and we shall continue laying them till the work is completed. The cost to us of the pipes is about £1000 in round numbers, and this includes the laying. The cost of the pipes for the eight miles will be £5414, and the laying £2386—£7800 altogether, without the hydrants and cocks. The cost of our reservoir, when we purpose to make it, will be about £700 or £800; it will be covered and properly lined. The settling-pond in the new scheme could not be made as I say for £560. It could not be excavated for that sum. The brook, from its natural position, would be a bad source of supply. Coming through grass and boggy land, on which were droppings of cattle, the water would be sure to be contaminated. We have £25,000 *bonâ fide* subscribed to our company. We have spent on our works at Caterham altogether, including the sinking of the well, up to June, 1866, £15,499, I think; and since then, as nearly as I can tell, some £1500 or £2000 more. The new well has cost £1400 or £1500.

Re-examined by Mr. STEPHENS: Any arguments drawn from the fact of our commencing to lay our pipes on Friday week are simply delusive. We could not get our pipes before that time.

Mr. *Balch*, examined by Mr. STEPHENS.

I reside at Caterham, and have lived there many years. Before the construction of these works there was a great want of water in that locality.

The COMMITTEE thought there was no need to go into the quality and quantity of the water at Caterham. It had already been given in evidence.

Mr. LOCH admitted that the Caterham water was of the best quality.

Mr. STEPHENS wished to be informed what decision had been come to with regard to the asylum. In the absence of his learned friend, Mr. Aspinall indicated that some arrangement had been come to.

Mr. LOCH said that an arrangement had been effected with the trustees, by which the new company were to supply the institution with 25,000 gallons per day, at a cost of £100 per annum.

Mr. STEPHENS: A preferential supply?

Mr. LOCH: Not at all—a commercial supply.

Mr. STEPHENS then proceeded to address their lordships against the bill. He believed the real points for the consideration of their lordships were in reality few and simple. The promoters appeared before them for the purpose of asking their assent to a proposal which comprises the supplying of water to the town of Redhill, to give a good and sufficient supply to the inhabitants of that town. Now there was no doubt that the promoters stated what was true in one respect, that a supply of water was urgently needed by the persons residing in that locality, but the scheme which they had propounded to enable them to do so was not one to which, he submitted, their lordships ought to give their sanction. It was a scheme brought forward for the purpose of ousting a company which already possessed parliamentary powers, and who were bound, as far as parliamentary powers could bind them, to give a proper supply of water to Redhill before the expiration of June next. It was a scheme, therefore, which their lordships were bound at the outset to look into with the closest attention and scrutiny. The facts adduced on either side were so clear in the recollection of the committee that it would be unnecessary for him to travel through them, and, therefore, in the observations he had to make he would be as brief as possible. Now, in the first place, his learned friend stated that the supply which the new company recommended for the adoption of their lordships was taken from a brook at a point above where the water was liable to contamination, and that it was in all respects a proper and good supply. If it had in the least degree been supposed to be so, he could have produced witness after witness to have satisfied their lordships to the contrary, but he had refrained from producing them, believing that the evidence he had adduced would be sufficient to controvert any assertion that might be made in that respect. The town of Redhill was not a town of an ordinary character. It was a town composed, on the one hand, of poor residents, and, on the other, of suburban mansions, occupied by the families of merchants and gentlemen from London, and for the purposes of the bill it might be treated as a suburb of the metropolis. Was it right, then, that water of the kind they had heard of should be introduced into the houses of those poor families which it was the object of the promoters of the scheme to do if their lordships gave them parliamentary powers? At the outset of the inquiry allusion had been made to a breach of faith on the part of the Caterham Company, and he (Mr. Stephens) could not help thinking that such a charge ought never to have been made, especially before their lordships tribunal; but it was a charge which it behove men to meet to the utmost, and one which other men ought to be very chary how it was made—especially if, in their own proposition, there was anything that savoured of weakness. Now he had to submit that they were willing and ready, as they always had been to carry out their parliamentary obligations to the very letter, and therefore such a charge had been unjustifiably made. And what were the advantages to be given by the two companies? In the first instance, the water of the Caterham Company was admitted to be perfectly fitted for the supply of the town; in fact, it had been stated by one of the witnesses to be equal, if not to exceed, the quality of the water in Loch Katrine—that famous water of which so much was heard amongst the water-works contests in this country. On the other hand, the new company proposed to give their supply from a source which was in all respects objectionable. Surely the water raised by the Caterham works was pre-eminent in quality, and if so, why should that be forced upon the community which would be positively injurious to them? It was not till 1864, although the Act was passed two years previously, that the Redhill people came forward with a request to the Caterham Company that they would supply that town with water, and as far as that company were concerned, if they had but been in the position, commercially speaking, to have done it, they would have been delighted; but, of course, as their lordships would see, they were not able at the time, owing to their inability to get piping, and so forth, and the invitation had to be put aside for a time, a positive assurance being given by the company that they would fulfil their obligations to the utmost. From the first the Caterham Company intended to go to Redhill whenever they had the means of supply, and now that that had been attained, the object they had so long contemplated would undoubtedly be carried into effect. Every step most assuredly had been taken that was consistent with the circumstances of the company, and the time to perfect the link in the chain of supply, and before June the Caterham water would be for the use of the Redhill people as well as for those who resided in the district. On the contrary, he would ask their lordships if they were satisfied with the engineering scheme of the promoters; could they believe that the water of the Redhill brook was at all equal to that of the Caterham works; could they believe in the satisfactory nature of the calculations upon which that scheme was based; could their lordships believe that in its very nature it bore evidence of that maturity without which evidence had shown no water-works ought to be made? Mr. Homersham, as a water engineer of 25 years standing, had dissected for their lordships the proposal which had been made on behalf of the promoters. He had shown, as the other witnesses had done, that the nature of the soil in which the settling-pond was proposed to be made was such that the water would become contaminated a great deal more than it was before it was placed there. To construct a settling-pond in such a locality, without lining it, was simply to put the water which was to be used for drinking purposes into so many muddy holes, or into worse than muddy holes, for such beyond doubt would be the case when they considered the nature of the soil and the way in which impurities oozed out of it. They had heard from the evidence of gentlemen resident in the district that the ground was boggy, and that, whenever a cutting was made in it, it soon became filled with water on which a scum collected, and which to all intents and purposes was unfit for human consumption. He believed, therefore, that when their lordships took all the circumstances of the case into their consideration, they would be of opinion that the estimates and plans of the proposed scheme had been made without a knowledge of anything like the facts of the case. There had been some evidence given as to the character of the plans which were put forward in 1865, and he could not refrain from observing that, although they differed somewhat from the present plans, they had all their crudeness and insufficiency. The scheme was one which stood, as he had observed, in a very peculiar position. His learned friend most certainly had shown the need that existed for the establishment of a water company in Redhill. He (the learned counsel) did not deny it; on the contrary, he had admitted it, in order to save the time of the committee, in an early stage of the inquiry; but what his learned friend must show was the necessity that existed for two water companies in the locality. That, he contended, he had entirely failed to do. The Caterham Company, on the contrary, were already in possession of the ground; they had parliamentary powers to supply the district with water, and most assuredly they meant to establish works there. Now, would a second supply be at all required in Redhill after the Caterham Company had taken their works there? and, if so, would it be desirable that the supply should come from such a source as the brook in question? Would their lordships be satisfied—did they believe, after the evidence that had been given by the gentlemen who had been called on behalf of the opposition, and one of those gentlemen had said that he had been obliged to caution his mowers against drinking the water of the brook during summer-time—that any process of filtration would effectually remove those injurious ingredients which it was proved entered into the composition of the water of the stream? One of the medical witnesses had stated that sewage matter evidently ran into the brook, and it had been proved that when once water was polluted by that no system of filtration was effectual. As to the other witnesses who were examined by his learned friend as to the parish of Merstham, one of them said that no sewage drained into the brook at all; another admitted there was sewage, but that there was no system of drainage there; a third said there was a system of sewage, but that it did not go into the brook; and a fourth told their lordships that it went in another direction. Evidently in all this there was much difference of opinion—there was room for their lordships to doubt as to the purity of the water. On the other hand, the witnesses for the opposition had proved, and incontestably so, that the water in the brook was polluted by organic matter, and extensively polluted, not only by sewage, but by the refuse of slaughter-houses and of cattle, the washings of sheep, and by filth of every description. To show which water was the best, and the impossibility of polluted water being rendered pure and fit for drinking purposes, he would draw the attention of their lordships to the report of the Royal Commission, appointed at the instance of the late Chief Secretary of State, Sir George Grey. The commissioners, who were men of the highest scientific attainments, reported in favour entirely of chalk spring water, and in the strongest way against the use of water such as the brook in question would supply. The commissioners reported also, and so recently as last year, that filtration of water had been tried in many forms without success, that disinfectants did not disinfect, and that filters did not filter—in short, that both had failed. If once sewage matter got into water it could not be got out of it. Now, in the face of such a report, his learned friend came there to recommend their lordships to give their sanction to a scheme which was to supply a town with water into which sewage matter had been proved to run. Then, again, as to the quantity of water, there had not been much evidence upon that; but it had been said that the supply was variable, that in summer-time the brook was nearly dry, that at other times it was subject to floods and the melting of snows, that it was of varied temperature—that, in short, it was subject to all the influences that surface water must be subject to—and yet their lordships were asked to put that water in contrast with the Caterham water, the supply of which was always the same, which was always of an equal temperature, which was always pure and beautiful, and which could not be at all affected by the atmosphere, because it was pumped from the chalk beds, and was not exposed to the air in any way. Their lordships would not, he was sure, forget that suggestive little bottle that had been produced by Dr. Lancaster, and if it were true that substances of the kind did exist in that water, which it was proved, beyond all doubt, did so exist, then if their lordships sanctioned the scheme they would, instead of doing a public benefit, be inflicting a calamity of the worst kind upon the people living in that locality. The learned gentleman, in conclusion, said the question appeared to be this, that if the Caterham Company could supply Redhill with water there was no ground whatever for the promoters case. The sinking of the second shaft would, beyond all question, meet the requirements, and it would afford a supply of water that was ample for all purposes. If further works were necessary in the course of time, the Caterham Company would have the power of constructing them, and of supplying water to any extent, for, when once they reached the chalk supply, they had entered upon a natural reservoir, where, he might say, the purest water had been collecting for ages, and they could draw from a fountain that was inexhaustible. On the contrary, let the promoters of the scheme, with their supply from the brook, once feel the severe effects of a dry season, superadded to other difficulties, and at once their supply would be reduced to an infinitesimal one. He trusted, therefore, he had shown their lordships that there was no ground for the promoters case, and that there was no ground, above all, for the allegations that had been made by them as to a breach of faith on the part of the Caterham Company. It was their intention now—and he would repeat it—as it always had been, to carry their pipes to Redhill, and to supply that town and district with water of the best and purest character. Impure water supplied to a town would inflict the severest injuries upon the community. Railway bills generally contained questions of convenience and of profit, gas bills evoked questions of lighting and convenience, but a water bill involved questions of life and health, and ought, therefore, to be most carefully and studiously dealt with. He, therefore, asked their lordships to disregard entirely the promoters case, and to give credence to the intentions of the Caterham Company, for undoubtedly before the bill, if sanctioned, could pass through the usual formalities, and receive the Royal assent, the Caterham water would be in Redhill, and after that what need would there be for a second supply, and a supply coming, as it would, from a source so contaminated as the brook in question?

FRIDAY, MARCH 15.

Mr. LOCH addressed the committee in favour of the bill, contending that he had submitted to their lordships a scheme which was in every respect deserving their sanction and approval. The learned gentleman at considerable length reviewed the evidence that had been given on the previous day, and submitted that it was entirely owing to the breach of faith on the part of the Caterham Company that the promoters were compelled to come forward with their bill, to afford that supply which the Caterham Company had failed to give. Mr. Loch also adverted at length to the delay on the part of the Caterham Company, and to their apathy and neglect in not fulfilling the parliamentary obligations that were imposed upon them. The allegations as to the impurity of the water in the Redhill brook were next combated by the learned gentleman, who argued that if the water of a brook was unfit for human consumption, even supposing it were true that impurities did find their way into the brook in question, from where would the great towns of England receive their supply? He would ask the committee to remember the evidence of Dr. Odling, who stated that the water was fit for human consumption, and the evidence also of their engineer, Mr. Richardson, who had said that upwards of 4 million gallons per day passed down the stream, and that the minimum quantity would not be less than one-third of that quantity. That the promoters were ready to give for the sum of £14,000 an immediate supply to the 8000 people of Redhill of 300,000 gallons per day, whilst the Caterham Company could afford them a share only of 220,000 gallons.

The room was then cleared, and after their lordships had considered the merits of the bill, the public were readmitted, when the chairman said their lordships had come to the decision that the preamble of the bill was not proved.

HOUSE OF COMMONS.

COURT OF REFEREES.

(*Present:—Colonel* STUART, *Chairman; Mr.* BONHAM-CARTER, *and Mr.* HASSARD.)

LEEDS CORPORATION WATER BILL.

TUESDAY, APRIL 2.

Mr. VERNON HARCOURT, Q.C., and the Hon. GRANVILLE SOMERSET appeared for the promoters; and Mr. E. V. RICHARDS for Lady Frankland Russell, a petitioner against the bill.

Mr. VERNON HARCOURT said this, though apparently a large scheme, was one which would not occupy the attention of the referees for any length of time. It was a scheme for enlarging and improving the supply of water to Leeds. Originally, as might very readily be imagined, to a proposal of this magnitude there was a considerable amount of opposition, but by the process of negociation, which of late had been so successfully carried out in water-works cases, that opposition had been reduced to small dimensions. He should, therefore, confine his observations, in opening the inquiry on behalf of the promoters, to the smallest possible space consistently with an attempt to make the matter intelligible to the court. The first thing necessary to explain was the nature of the existing supply of water to Leeds. Previous to the year 1837 Leeds was supplied from the Aire, a river which flows through the town, and he need not explain to any person at all conversant with the place that to take water for domestic purposes from the Aire at that spot was as bad, if not worse, than resorting to the Thames at London Bridge. In 1837 a further supply of water was needed, and the drainage of a small basin of land, containing some 1500 acres, and yielding from a million to a million and a half gallons of water per day, was impounded in a reservoir constructed for the purpose, and called the Eccup reservoir. From that reservoir the water was carried, by a tunnel through a rock, down to some filtering-beds at Weetwood, where was a sort of deposit reservoir, and from whence it went into the Woodhouse reservoir, for the supply of the town. In 1843 it was found necessary to obtain further powers, and in 1851 an agreement was made with the Earl of Harewood, whose property was in the vicinity, by which power was given to pump 2½ million gallons of water daily from the Wharfe. As Leeds lay in a different valley it was necessary to raise the water, and accordingly it was pumped up to a place called Stubhouse, whence it flowed by a conduit into the Eccup reservoir. The arrangement with Lord Harewood was confirmed by an Act of Parliament in 1852. At that time the water supply, which had been in the hands of the Leeds Improvement Commissioners was transferred to the corporation. In 1853 the arrangement with Lord Harewood was terminated, and Leeds was again reunited to the Eccup supply, which was very insufficient, as might well be supposed, for a town of that size. It was found necessary to go to the Wharfe again, and by a further agreement with Lord Harewood and Mr. Sheepshanks, the water was taken at a place higher up, called Arthington. By an Act passed in 1856, authority was given to the corporation to pump 2½ millions gallons of water at Arthington. This water was pumped up to Stubhouse, and from there it flowed into the Eccup reservoir, which thus became a deposit reservoir for the waters of the Wharfe, as well as a collecting reservoir for the waters of the Eccup valley; thence the water flowed by gravitation to Weetwood, and so was distributed in the town of Leeds. In 1862 a still further quantity of water was required, and authority was given by an Act of Parliament passed in that year to take 6 million gallons of water from the Wharfe at Arthington. A compensation was given to persons interested in the river below Arthington, which compensation was paid in money. The water thus obtained was in fact the whole of the present supply of Leeds, *plus* about 1 million gallons obtained in wet seasons, making a total of about 7 million gallons daily. He ought to mention that when the water of the Wharfe began to be taken, it was found necessary to establish a filtering system at Weetwood, which was effected by laying the bottom of the reservoir with gravel, over and through which the water flowed, leaving a sediment on the surface of the gravel. The outlay upon the present works was about £410,000, and the annual cost of pumping up the water from the Wharfe to Stubhouse, and so conveying it into the Eccup reservoir was about £3000. The population of Leeds was 240,000, and was rapidly increasing, as also was the daily demand for water for domestic and trade purposes, so that it now became necessary again to apply to Parliament for extended powers. There were two reasons why a fresh supply of water was wanted. First of all, the present consumption in Leeds amounted to about 4½ million gallons per day, so that there was a margin of only about 2½ million gallons upon the existing supply. It was found that the demand for water was increasing in a ratio which would be represented by an increased supply of 450 million gallons per annum. It was plain, therefore, that under the present powers of the corporation, in about five years the margin which now existed would be exceeded, and they would have no power to meet the demands of the town. Five years was the time usually taken for the construction of works of the description contemplated by this bill, so that they would just be ready to come into operation at the period when the existing supply of water became exhausted. This would be a reason, in any event, for seeking these further powers, and for seeking them at the present time. But beyond that it might be said, "Why not take additional powers to take water from the Wharfe?" The answer to this was that the inhabitants of Leeds were entirely dissatisfied with the character of the existing water supply. The Wharfe was a stream that rose, as honourable members probably knew, in a very romantic coun y o West Riding of York, but after passing Bolton Bridge, it flowed through a district which contained a considerable population. A reference to the map would show that several populous places—Addingham, Burley, Ilkley, Otley, &c.—existed on the banks, from which offensive matters found their way into the stream. The sewage of Otley, a few miles below Addingham, and also of Ilkley, was conveyed into the Wharfe, and he (Mr. Harcourt) had before him a report upon the subject, which probably would not be disputed on the other side, and therefore he need not refer to it at any length. It was prepared by Mr. Hunter, of Leeds, and gave a description of the pollution which existed in the Wharfe above Addingham, and between there and Bolton Bridge. Any one who had seen, as he had done, the filter-beds at the water-works of Leeds, would know that the statements in this report were not unfounded. It was found necessary every week or two to cleanse the surface of the filtering-beds. A quantity of scum of a very offensive description accumulated upon them, which was, in point of fact, the residuum of the organic matters which the waters of the Wharfe contained; and therefore, without acting upon the old maxim, *de gustibus non est disputandum*, it was not surprising that the people of Leeds objected to the supply of water from the Wharfe. If there was one thing more important than another in reference to the quality of water for domestic purposes, it was the question of hardness. The water of the upper Wharfe came out of the limestone district, and the degree of hardness in that water, as at present supplied to Leeds, was 8·5; the solid matter per gallon was 14 grains, and of organic matter ·69. That being the state of things, and a better supply being needed, measures were taken to ascertain what would be the best possible method of improving and extending the supply. The country was very carefully examined, and ultimately, for reasons which he need not now enter upon, it was decided to have recourse to one of the affluents of the Wharfe—viz., the Washburne. It was upon a supply from that stream that the present proposal was based. First of all, instead of pumping from the Wharfe at Arthington, it was proposed to take powers to lay a pipe down at the Washburne foot, which would carry the water to Arthington, and it would be pumped from there instead of from the Wharfe. The Washburne water had been examined, and found in every respect very superior in quality. First of all, coming out of the millstone-grit system, its hardness was represented by 2·5 as compared with 8·5—*i. e.*, about one-fourth of the hardness of the Wharfe, which was from the limestone system; and this was a matter of great consequence at Leeds, not only because of its superiority for domestic purposes, but because of its trade advantages in connexion with the manufacture of cloth. On the point of purity the contrast was still more striking; for whereas, upon analysis, the total solid matter per gallon in the Wharfe water was represented by 14, the solid matter in the Washburne, taken at various places, ranged from 4 to 7 grains per gallon. In reference to organic matters, as distinguished from solid matter, the advantage was equally conspicuous, for instead of being ·6 it was ·2, ·3, and ·4; therefore, the Washburne was in every respect preferable to the Wharfe. It was subject, of course, to accidental impurities, which arose from the fact that the ground from which it was supplied was moor land, and consequently there was, to a certain extent, an infusion of peat. But this was dealt with by the engineer; the impurities could be removed, and in heavy floods their was an arrangement by which the peat water would not be stored in the reservoir. The district of the Washburne was entirely free from the kind of pollution to which the Wharfe was subject. Its valley contained an extremely small population; the land possessed no agricultural value, and consequently the water flowed down comparatively unmixed as it descended from the skies. This was all that need be said as to the character of the water of the Washburne, and he would pass at once to the scheme by which it was proposed to utilize it. The first part of the scheme was to take the Washburne water at Arthington, and this would be done by means of a small dam at the Washburne bottom. The water collected there would be pumped up to Stubhouse, from whence it would flow by gravitation to Leeds, and so far the scheme was simply a substitution of the one river for the other. It was proposed in this way to take 6 million gallons daily from the foot of the Washburne, still retaining the power to take water from the Wharfe, if necessary; but the corporation limited themselves to take not more than the 6 million gallons from the two jointly. They asked for power to take a further supply from the upper part of the Washburne, and to that feature of the scheme he would refer presently. In order to carry out the first part of the scheme, they would have to construct a reservoir at Lindlywood, because in dry seasons the Washburne at its foot would not supply 6 million gallons daily, and, indeed, not more than 2½ million gallons. From the Lindlywood reservoir the water would flow into the natural stream of the Washburne, and so always keep the stream at its level at the foot. This reservoir would contain 749 million gallons, and what was more important was that the supply there would be equivalent to 180 days consumption. Taking the water at Washburne foot involved the necessity of giving compensation to two miles, but no question arose on that point, as they had arranged for a compensation in money. It might be possible hereafter to take the water from a higher point, and then the Lindlywood reservoir would be used only for compensation purposes. The promoters then proposed to take an additional supply from the upper waters of the Washburne to the extent of 8 million gallons daily, which would be obtained and delivered into Leeds by the process of gravitation, for as it would be taken at a higher level it would not be necessary to pump, except to get over the hill into the valley in which Leeds lay. By means of a conduit, it would flow from the Swinsty reservoir to Stubhouse, where it would meet the existing supply to Leeds, and so pass to the Eccup reservoir and the Weetwood filtering-beds. In order to accomplish this object the first thing to do was to give compensation to the millowners, and all other persons interested in the waters of the Washburne, and it was for this purpose that the Swinsty reservior would be constructed. Of course, if no water were taken from Washburne foot, the promoters would be absolved from sending down any compensation from the Swinsty reservoir, and under such an arrangement a still further supply might be taken from the upper part of the Washburne.

Mr. HASSARD: Is the Swinsty reservoir to be used wholly for compensation purposes?

Mr. HARCOURT: It is to be so long as we pump from the Washburne foot, but under possible contingencies it may become a service reservoir.

Mr. HASSARD: The construction is not such but what it might be used for storeage.

Mr. HARCOURT said he believed he was right in saying that it might, and probably at some future time it would, be so used. All the millowners were satisfied with the compensation provided under the scheme. The 8 million gallons additional, which it was proposed to supply to Leeds by

gravitation, would be stored in two reservoirs, one situated at Fewston, and the other at Thurscross, the reservoir at the latter place also providing compensation for millowners whose property was situated between the two. It was satisfactory to be able to inform the court that the opponents to the bill, who had been very numerous, were now all settled with but one. The principal opponent originally was a gentleman, the owner of property, who was well known and greatly respected in Yorkshire (Mr. Fowkes), but the promoters had offered terms with which that gentleman was satisfied, and therefore they had not now got to encounter his opposition. There were also other opponents among the millowners and others, but they were all satisfied, and, as he had stated, the only opponent was Lady Frankland Russell, who was the possessor of property very beautifully situated, but not elegantly named—a place called Blubberhouses, near the Fewston reservoir. But he (Mr. Harcourt) would show that the way in which this scheme affected her property would not be injurious. It consisted of agricultural land, and there was no residence there. The petitioner stated that her property extended over 3524 acres, comprising valuable mineral ground; and the gist of the petition was that Lady Frankland Russell had granted mineral leases upon her estate, and that the works proposed under this bill would interfere with the working of these minerals. She complained, not so much of the abstraction of the water, though that was objected to, but that the promoters would interfere with her enjoyment of the water for various purposes connected with her property, especially for mineral purposes. The reply to these allegations was that the Water-Works Clauses Act, especially the provisions of clause 16, provided that nothing contained in that Act should prevent the owners and occupiers for the time being of land, through or by which such streams flowed, from using the waters thereof in the same manner as they were entitled to use them before the passing of the Act, unless they received compensation for the use of such water by the promoters. Therefore, her ladyship would have as great a use of this stream as she now possessed, or would receive compensation for giving up her rights. He, however, was instructed that Lady Russell's property did not touch the Washburne itself; that she had no actual access to the water on that part of her property with which the promoters interfered. There were other allegations in the petition, to which he would not advert, because his learned friend who appeared for her ladyship did not intend to go into the general merits of the scheme. He would, therefore, state in conclusion that the estimate for the proposed works was £410,000.

Mr. HASSARD: That does not seem to be questioned.

Thomas Hawksley, Esq., examined by Mr. GRANVILLE SOMERSET.

For the last 15 years I have been consulting engineer to the corporation of Leeds. I am very well acquainted with the requirements of the town, and with the existing state of things in reference to the supply of water. I have been for many years acquainted with the district, and with that portion of it especially, from which, by this scheme, it is proposed to supply water to Leeds. At the present moment the town contains a population of about 240,000, and with the additional district the population may amount to 250,000. It is a rapidly increasing population. I should think, in the ratio of 2½ per cent. per annum, the township of Leeds contained 101,000 inhabitants in 1851, which had become 117,000 in 1861. Then there are additional parishes which brought up the whole population of the borough in 1851 to 172,262, and in 10 years afterwards this number had grown to 207,021, so that the decimal increase was as nearly as possible 20 per cent. The average gross daily consumption of water in 1852, when the corporation became possessors of the water-works, which had been formerly carried on by a company, was 1,252,000 gallons; in 1860 the consumption had risen to 2,500,000 gallons; in 1866 to 4,500,000 gallons, and the estimate for 1867 was 5,000,000 gallons per day, so that the consumption is increasing at the rate of more than 10 per cent. Leeds is a very large manufacturing town, and a great cloth trade is carried on there. That trade requires pure and soft water. In my opinion, within about 30 years, it may be expected the population will be doubled. We know by experience that the water requirements of such a town are at the rate of 30 gallons per head per day. Even with the greatest economy 20 gallons per head per day will be needed for domestic and sanitary purposes, and beyond this, 10 gallons per head per day is not too much to allow for trade purposes; provided a soft water can be obtained. That would be 15 million gallons of water per day. The present capabilities of the corporation are 7 million gallons, being 6 millions which, by Act of Parliament, they are limited to from the Wharfe, and 1 million from the gathering grounds of the purchased works at Eccup. The water of the Wharfe is, to some extent, polluted now, and is becoming daily more so. There are five small towns on its course, four of which are manufacturing towns, and one is the well-known bathing place, Ilkley. All the refuse waters from these towns go into the Wharfe, and the inhabitants of Leeds have taken a great objection to this source of supply. Besides these contaminations, there is the fact that the water comes in a large degree from the limestone district, and is much harder than other waters in the neighbourhood. The manufacturing population are very anxious for an improvement in the quality of the water supply, and therefore, on both these grounds, the corporation desire power to substitute the Washburne for the Wharfe. It is found that the soft water gives a silky texture to the goods, while the hard water gives a harsh character to them. The actual quantity now pumped at Arthington is about 4½ million gallons per diem, and that water will go to the Eccup store, and by the Woodhouse reservoir. The proposed scheme naturally divides itself into two parts—one part consisting simply of the substitution of the Washburne water for the Wharfe water. That substituted quantity is to be taken at the point at which the Washburne now unites itself with the Wharfe, and it will amount to 6 million gallons. Then there is a further supply obtainable from the district amounting to 8 million gallons, which can be obtained by gravitation from the Fewston reservoir, and is proposed to be brought down in a pipe immediately to the Eccup reservoir. Leeds will thus be in possession of 14 million gallons per day from this source, and 1 million from Eccup itself. This will give 30 gallons per head per day to a population of 500,000. In respect to the 8 million gallons which we propose to take, we are required to give compensation to the Wharfe to the extent of 4 million gallons per day; the compensation for the 6 million gallons we take is paid for in money. The first object of the corporation is to withdraw 6 million gallons a day from Washburne foot, in substitution for the 6 million gallons they are now authorized to take from the Wharfe at this point; they will, therefore, immediately lay down pipes to carry that water to the pumping-station, where it will be raised and put into the Eccup reservoir. Having done that, they will then proceed to make the works required at the upper part of the Washburne, which consist of the four reservoirs, marked on the plan; one called the Thruscross, the second the Fewston, third the Swinsty, and fourth, the Lindley Wood. From these reservoirs the supply will be carried down through a pipe, and will also come to the Eccup reservoir, not requiring to be pumped. From the Thruscross reservoir the compensation water will be given to the mills, which water, after driving the mills, will be re-collected into the Fewston reservoir. The Fewston reservoir and the Swinsty reservoir are practically one, but they are at different levels. Compensation water will be led out of the Swinsty reservoir, and will flow down the bed of the Washburne to turn whatever mills there are upon the course, also to satisfy riparian rights, and will be collected in the Lindley Wood reservoir. From this reservoir the compensation of 4 million gallons to the Wharfe is to be led down the bed of the stream. That will satisfy the riparian interests and drive the mills, so that the scheme will be complete. The river will be compensated for the extra quantity of water taken; and all the streams from the upper reservoir down to the weir at Washburne foot will have their compensation water. This compensation has been calculated upon; one-third of the available rainfall, after deducting one-sixth for the non-collectable water, and then dividing the remainder (taking off a certain amount for evaporation) into three parts, of which two parts will be given to Leeds, and one to the Wharfe. With this arrangement every person is satisfied. The Washburne does not at all times discharge 6 million gallons a day at the foot; so that we shall dam the remainder to make up the 6 million gallons from the Wharfe till the upper reservoirs are completed.

Tabular Statement of Reservoirs.

Name of Reservoir.	Drainage Area.	Capacity.	Surface Area.	Depth of Water.	Height of Bank.
	Acres.	Gallons.	Acres.	Feet.	Feet.
Thruscross	4,315	538,000,000	50	95	102
Fewston	13,430	866,000,000	156	60	68
Swinsty	17,254	961,000,000	156	60	67
Lindley Wood . . .	21,709	749,000,000	117	69	67

Drainage area to Washburne Foot, 23,329 acres.

The estimate for the works is £410,000. There is no opposition to the scheme except by Lady Frankland Russell. The district from whence the water will be drawn contains a very small population. I know Lady Frankland Russell's property.

Mr. RICHARDS: I appear for Lady Frankland Russell, and I think an interval of five minutes might save my friend the trouble of asking any questions on this point.

Mr. HASSARD: I suppose we may take the statement of Mr. Vernon Harcourt as to the analysis of the water as undisputed.

Mr. GRANVILLE SOMERSET: I might call Dr. Letheby to prove it, if desirable, but I do not wish to burden the case with evidence.

The further hearing was adjourned for a short time. On the proceedings being resumed,

Mr. RICHARDS said: I am going to ask Mr. Hawksley a question, which I think will put a stop to any further examination. (To witness:) You are acquainted with the position of Lady Frankland Russell's property?

Witness: I am.

Mr. RICHARDS: Are you also aware that she possesses some valuable minerals in her estate?

Witness: She possesses some minerals in the ground that she owns.

Mr. RICHARDS: Would you have any objection to introduce into the bill a clause to the effect that nothing in this Act shall prevent any of the owners, lessees, or occupiers from time to time of any of the lands now belonging to Lady Frankland Russell, and not taken under this Act by the corporation, from, or prejudically affect them in the working of any mines, or the gaining, washing, or dealing with any minerals, in such manner as they lawfully might do if this Act had not passed; and providing that if they are so prevented or prejudically affected, the corporation shall make full compensation in that behalf?

Witness: I have read the clause proposed, and see no objection to it.

Mr. HASSARD: Supposing there were any pumping from the mines, how would it be separated from the reservoir?

Witness: It cannot be separated; but that water will do no harm in going into these large reservoirs. There is nothing poisonous in it.

Mr. HASSARD: What kind of mineral is it?

Witness: It is a small lead-mine on the top of a mountainous country, quite two miles from the reservoir. I have seen it, and I believe there were four men at work.

Mr. HASSARD: Do you say that the water from that mine would not injure the water?

Witness: The water from that mine is perfectly innocuous; there is no lead in the mine, there is only galena, and there is no harm whatever. Many towns are supplied from rivers in which such waters flow; take, for example, Durham and Derwent. The mineral is not soluble in water.

Mr. RICHARDS: You have no objection whatever to the clause proposed?

Witness: None whatever.

Mr. RICHARDS: Under these circumstances, although there were some other points, I need not trouble the court further.

The preamble of the bill was then declared to be proved, and the clauses were proceeded with.

On clause 21 being read,

Mr. HAWKSLEY said: This is a clause we find it necessary to introduce into all bills for the supply of hilly districts. The 35th section of the Water-Works Clauses Act is impracticable here. It prescribes that the water in all cases shall be sent to the top storey of the highest house. Now here, in many cases, the houses are built on hills, and it is impossible to supply them. Some of them are on the walls of the reservoir.

Mr. HASSARD: I did not expect to hear the word "impossible" from you, Mr. Hawksley.

Mr. HAWKSLEY: I mean it is impossible by gravitation, or except by engine power.

Mr. HASSARD: This clause goes to the effect that if you did not like to lay down pipes, it would excuse you.

Mr. HAWKSLEY: No doubt it would; but unless you draw a very complicated clause, I do not know how you are to meet the case. Leeds is very hilly, and it is necessary to put in such a clause for our protection, because if a fire should happen on one of these high levels, which could not be extinguished, the fire insurance companies might sue the corporation.

Mr. BONHAM-CARTER: You recollect, last session, there was a great deal of opposition to the water bills?

Mr. HAWKSLEY: And I may remind you that you all came to the conclusion they were wrong, and the petitions were withdrawn.

Mr. BONHAM-CARTER: I thought that was by arrangement with the companies.

Mr. HAWKSLEY: No, not at all. I may mention that in the case of a fire at Liverpool there was an endeavour to claim £132,000.

Mr. HASSARD: I find fault with this clause, because it is so wide that you might arbitrarily say we will not give a supply. I think it ought to be limited, by inserting the words, "by reason of the height of the reservoir."

Mr. HAWKSLEY: There are no words of limitation that would apply, be-

cause of the friction, which is very great—10 feet upon the main-pipes, and 20 feet upon the distributing-pipes.

Mr. HASSARD: That is capable of control, but your goodwill is not.

After some discussion the referees decided to adopt, in place of this clause, the sixth clause of the Sheffield Act.

The other clauses were gone through and settled, and the chairman was directed to report the bill to the House.

Legal Intelligence.

COURT OF BANKRUPTCY.

THURSDAY, APRIL 18.

(*Before Mr. Commissioner* HOLROYD.)

Re TOM ABERCROMBIE HEDLEY.

The bankrupt again appeared, to pass his final examination, supported by his solicitor, Mr. GEORGE. Mr. REED, instructed by Mr. Bellamy, appeared for the assignees, and Mr. WALLINGTON for the Leamington Local Board of Health.

Mr. GEORGE: In this case I appear for the bankrupt, and Mr. Reed is the counsel instructed on the part of the assignees, but he does not offer any opposition, as I understand.

Mr. REED: This case was adjourned on the last occasion in order that we might make inquiries. We have made inquiries with regard to the contract which the bankrupt had entered into for the purpose of supplying gas at Uxbridge. We have also made inquiries with regard to some property which the bankrupt is alleged to have had in the shape of furniture, and upon which the assignee desires now to get a little further information, to ascertain whether there is any ground whatever for the suggestion made, that property was removed from the bankrupt's premises to a considerable amount. (To bankrupt:) Had you any furniture? I see you return none in the accounts.

Bankrupt: The day prior to the bankruptcy I had, to the extent of £1000 worth; indeed, £1000 would not replace it. I always insured for £800.

Mr. REED: I see you do not return any furniture here.

Bankrupt: No.

Mr. REED: What has become of the whole of it?

Bankrupt: The day before the bankruptcy it was taken by my solicitor under a bill of sale.

Mr. REED: Taken by your solicitor?

Bankrupt: Yes.

Mr. REED: What was his name?

Bankrupt: Tibbitts.

Mr. REED: You say taken by Tibbitts. Where was it taken?

Bankrupt: It was put into the hands of Lumley, of Chancery Lane, and sold by auction.

Mr. REED: Sold by Mr. Tibbitts?

Bankrupt: Sold by Lumley at his direction.

Mr. REED: Do you know what the furniture produced?

Bankrupt: I do not. I have heard that it did not produce enough to pay the bill of sale.

Mr. REED: How much did you give the bill of sale for?

Bankrupt: I have said before, I do not know whether it was for £200 or £230.

Mr. REED: Do you remember the date when you gave that bill of sale?

Bankrupt: No; it was about three years ago.

Mr. REED: Had any person been in possession of the furniture?

Bankrupt: Not till Mr. Lumley's man took possession the day before the bankruptcy.

Mr. REED: Then you were permitted, for a period of two or three years, to use the furniture till the day before the bankruptcy?

Bankrupt: I was permitted, as long as I paid the interest on the loan, to use the furniture.

Mr. REED: Is Mr. Tibbits your attorney now?

Bankrupt: He is not.

Mr. REED: Have you had the use of any of your furniture since your bankruptcy?

Bankrupt: I have not; it was all sold by Mr. Lumley.

Mr. REED: Did he clear away everything you had on the premises in the shape of furniture?

Bankrupt: Mr. Lumley's people did.

Mr. REED: Be good enough to tell me where I shall see anything in your accounts about the bill of sale on your furniture to Mr. Tibbitts?

Bankrupt: You will see it all in the balance-sheet.

Mr. REED: Tell me where it is in the balance-sheet.

Bankrupt: I do not know.

The COMMISSIONER: But you have sworn to the truth of it.

Bankrupt: I only know it is in the balance-sheet.

Mr. EDWARDS (official assignee): It is in the property-sheet of the original balance-sheet, filed on the 2nd of July. It says: "I gave a bill of sale to Mr. T. A. Tibbitts, solicitor, of Gray's Inn, about June, 1864, as security for the loan of £200, and for payment of the interest thereon, but he has seized the property and sold it."

Mr. REED: But he does not say that this was the day before he filed his petition.

Mr. GEORGE: Go on reading.

Mr. REED: "I have no account of the same. I estimate the furniture to have cost me £1000." There are no dates of any kind or description.

Mr. EDWARDS: Except the date of the bill of sale.

Mr. REED: Yes; but one would think from this that the property was seized a long time before the bankruptcy. (To bankrupt:) Then this bill of sale was signed in 1864, and you were permitted to use the furniture included in it till the day before the bankruptcy, and then Tibbitts sent in persons, without notice, and removed the whole of it?

Bankrupt: Yes; he sent without my knowing anything of it, and bills were placarded, and the property sold some eight or ten days afterwards.

Mr. REED: Have you a copy of it?

Bankrupt: No; I never saw it.

Mr. REED: Was any demand made for payment of the £200 before the sale?

Bankrupt: There were weekly demands made upon me pending the taxation of Mr. Wallington's costs.

Mr. REED: But was any specific demand made by Tibbitts prior to his taking possession of the whole of the furniture?

Bankrupt: Oh, yes.

Mr. REED: Tell me when.

Bankrupt: I should think every day for a week previously he asked me for it.

Mr. REED: When you say he asked you for it, you mean merely verbally?

Bankrupt: He asked me to let him have the money back.

Mr. REED: Who prepared your petition?

Bankrupt: Mr. George.

Mr. REED: Had Tibbitts anything to do with it?

Bankrupt: Mr. Tibbitts knew no more than you do.

Mr. REED: Then he is not your attorney now?

Bankrupt: He ceased to be my attorney the day before I filed my petition.

Mr. REED: Was any of your furniture raffled for—I wish you to think what you say—either just before or since your bankruptcy?

Bankrupt: There were a few things, after my bankruptcy, that had been my property, that were left.

Mr. REED: Was it furniture?

Bankrupt: No.

Mr. REED: What was it?

Bankrupt: There were a few small pictures, and there was a watch and some books.

Mr. REED: Did it amount to £160 worth of property that was raffled for after your bankruptcy?

Bankrupt: They were not worth that.

Mr. REED: Was that the value that was placed upon them for the purpose of the raffle?

Bankrupt: No; it was not so much.

Mr. REED: Tell me how much it was.

Bankrupt: £150.

Mr. REED: Was that a portion of the property which you say Tibbetts had possession of under a bill of sale the day before your bankruptcy?

Bankrupt: It was not connected with it in any way.

Mr. REED: Was it property excluded from the operation of the bill of sale?

Bankrupt: It was.

Mr. REED: Tell me where I shall find anything about this £150 worth of property in your accounts?

Bankrupt: You will not find it there.

Mr. REED: Why not?

Bankrupt: Because they were not my property.

Mr. REED: Not yours?

Bankrupt: No.

Mr. REED: Whose were they?

Bankrupt: They belonged to different people.

Mr. REED: No, no. I am talking about your property.

Bankrupt: I do not understand you.

Mr. REED: I asked you distinctly, whether there was any property of yours which, either before or since the bankruptcy, had been raffled for?

Bankrupt: Then I say "No" to that.

Mr. REED: Then whose property was this? Was it property that you had had in your custody or possession?

Mr. GEORGE: Stop; he says it was not his.

Mr. REED: Whose property was it?

Mr. GEORGE: What property are you speaking of?

Mr. REED: I am speaking about £150 worth of property which has been raffled for since the bankruptcy.

Bankrupt: I had nothing to do with it.

Mr. REED: Whose property was it?

Bankrupt: You must ask the people who raffled it. I was speaking of property that had been mine.

The COMMISSIONER: How long before the bankruptcy had it been yours?

Bankrupt: Some months before.

The COMMISSIONER: How had it ceased to be yours?

Bankrupt: By my selling it.

Mr. REED: To whom did you sell it?

Bankrupt: It was sold some months before my bankruptcy.

Mr. REED: To whom did you sell it?

[Bankrupt did not answer, and the question was repeated.]

The COMMISSIONER: You know one of the reasons of your being before me is your having parted with some of your property.

Mr. REED: Do you mean to swear that you do not know to whom you sold your property? Tell me the person to whom you sold this £150 worth of property?

Bankrupt: It was no such thing as £150.

Mr. REED: How much?

Bankrupt: £50.

Mr. REED: Now, leave out the value, and tell me to whom you sold it? Honestly done, there is no harm in it.

The COMMISSIONER: There may be an opportunity of testing your statement.

Bankrupt: It has nothing to do with this case.

Mr. REED: Tell me to whom you sold it.

Bankrupt: This is being all done for a purpose. I shall decline to answer.

Mr. REED: It is not done for any purpose. The fact only came to my knowledge yesterday.

The COMMISSIONER: You must know what you have done with it.

Mr. EDWARDS: He has pawned it.

The COMMISSIONER: If so, he should say to whom he pawned it.

Mr. REED: I do not know whether you mean to answer.

Bankrupt: I don't mean to answer. There is a person here taking notes, and I don't want to get it into print.

The COMMISSIONER: If you decline to answer you may be committed.

Bankrupt: I shall decline to answer. There is a party here who will put in print what I say.

The COMMISSIONER: But I have a right to an answer.

Bankrupt: I have no objection to your knowing it, but I decline to give an answer which will get into print.

Mr. GEORGE: He has an objection to its getting into print.

Bankrupt: This thing has been going on for twelve months, and it has taken £1000 out of my pocket.

The COMMISSIONER: There must be a satisfactory account given of what you have done with the property. If you have disposed of it in a proper and fair way, you need not object to state the fact.

Mr. REED: Do you still decline to answer the question?

Bankrupt: I decline to answer the question.

Mr. REED (to the Commissioner): Then I must ask you, sir, to adjourn the examination *sine die*.

Bankrupt: There has been a private meeting, and I was two hours under examination. The question might have been put to me then.

Mr. REED: The question could not have been put to you then, for the information has only come to us since.

The COMMISSIONER (to bankrupt): It is not for you to form a judgment.

You must answer the question, or you make yourself liable to be committed to prison. If you decline to answer, the least I can do, upon the application made to me, is to adjourn the case *sine die*.

Bankrupt: I can but be ruined. This thing has been carried on for the last twelve months.

The COMMISSIONER: But you must treat the court with proper respect.

Bankrupt: If you, sir, knew the personal feeling of the party now speaking to Mr. Reed (Mr. Wallington)—he has been twelve months trying to ruin me.

The COMMISSIONER: You are only injuring yourself by this course of conduct.

Mr. REED: Do you decline to answer the question?

Bankrupt: I will not state it publicly.

Mr. EDWARDS (to Mr. Reed): Will you be satisfied by his answering me?

Mr. REED: No, indeed; he must do as other bankrupts do.

The COMMISSIONER: I can only adjourn the inquiry *sine die*, under the Act of Parliament.

Mr. GEORGE: The bankrupt is entitled to some little consideration. He has been subject to great expense, by reason of the prosecution of the clerk of the local board at Leamington. It is true there was an acquittal in that case, but there has been a vast amount of feeling.

Mr. REED: Why mix me up in it? I have had nothing to do with it.

Mr. GEORGE: It was stated yesterday to me that the gentlemen who had attended the private meeting were satisfied. Mr. Registrar Spring Rice dismissed the summons thereupon, and I thought there was an end of the matter. Now Mr. Reed says he was not aware at the time about this pawning or selling of goods. Of course, I advise the bankrupt to answer the question. I submit whether the case should not be adjourned for a certain time at the bankrupt's expense.

The COMMISSIONER: I think it will have to be an adjournment *sine die*, with liberty to apply as soon as the bankrupt is ready to comply with the Act of Parliament. I will give him the opportunity of taking proper advice.

Mr. GEORGE: I advise him to answer the question at once.

The bankrupt did not reply.

The COMMISSIONER: The case is adjourned *sine die*, and he will have the opportunity of considering the matter.

Mr. WALLINGTON: I am a creditor, and have been put to considerable expense.

Mr. GEORGE: You do not happen to be a creditor.

Mr. WALLINGTON: I am, and it is very hard under the circumstances.

Mr. GEORGE: He is a discharged clerk of the Leamington Board of Health.

Mr. WALLINGTON: I am not discharged; I have resigned, and the Board of Health have shown their confidence in me by instructing me to appear here to-day.

The COMMISSIONER: Are you a solicitor?

Mr. WALLINGTON: I am.

The COMMISSIONER: And you appear for a creditor?

Mr. WALLINGTON: Yes.

Mr. GEORGE: For what creditor?

Mr. WALLINGTON: For the Leamington Board of Health, on their distinct instructions.

Mr. GEORGE: Then I must ask the commissioner to call for the instructions, because this is the gentleman by whom all this has been done. I see by the papers that he has been discharged.

Mr. WALLINGTON: Mr. George knows that what he states is untrue.

The COMMISSIONER: I must treat him as any other creditor. The matter is now adjourned *sine die*.

Mr. WALLINGTON: With reference to my application for expenses?

The COMMISSIONER: That must stand over; I cannot do anything about it now.

Miscellaneous News.

GREAT CENTRAL GAS CONSUMERS COMPANY.

The Thirty-Second Half-Yearly Ordinary Meeting of this Company was held at the London Tavern, on Friday, April 26—Alderman DAKIN in the chair.

Mr. MASSEY (the secretary) read the notice convening the meeting, and the seal of the company was affixed to the register of shareholders.

The following report and accounts were then presented:—

The directors beg to submit for consideration the balance-sheet, together with the manufacturing and distribution accounts, for the year ending the 31st of December last, which have been examined by the professional accountants, Mr. Begbie and Mr. Chatteris, engaged by the company for that purpose, and whose certificate is appended. In reference thereto, it will be seen that the sum available for dividend amounts to £10,898 8s. 7d., out of which your directors recommend that a dividend be declared at the rate of 10 per cent. per annum, payable on and after the 28th day of May next.

The proprietors are aware that a bill has been introduced into Parliament, having for its object an alteration of the General Gas Act of 1860. This bill contains provisions manifestly unjust to those who have placed their capital in gas companies, on the faith of successive Acts of Parliament. Public opinion, as unequivocally expressed by the leading journals, has declared against the bill, and the department of the Government having charge of it has adjourned the consideration of its provisions until the 29th inst., with a view of making some arrangement by which legislation can be carried out on a basis at once fair to the gas companies and satisfactory to the public. To effect this object the gas companies will willingly lend their efforts, as it is obviously desirable that the present uncertainty regarding gas property should be put an end to.

Two of your directors, Mr. Wyld, M.P., and Mr. Rowe, retire in conformity with the provisions of the Companies Clauses Act, and, being eligible for re-election, offer themselves accordingly.

ANNUAL STATEMENT OF ACCOUNTS,

Showing the Actual State and Condition of the Concerns of the Great Central Gas Consumers Company, for the Twelve Months ended the 31st Day of December, 1866.

I. CAPITAL.—*State of the Account at the End of the above Twelve Months.*

Statute or Authority under which raised.	Number of Shares.	Amount per Share.	Paid up per Share.	Total paid up.	Total Capital.
Shares. . . . . (14th & 15th Vict., cap. 69, 185.)	20,000	£10	All.	All.	£200,000 0 0
			Rate per Cent.	Amount.	
Borrowed moneys			5	£66,000	66,000 0 0
Profits capitalized					None.
			Total capital		£266,000 0 0

II. REVENUE.—*Account during the above Twelve Months.*

INCOME.

Balances brought forward—		
Revenue account	£ 2,133 11 6	
Dividend ditto	10,000 0 0	
		£12,133 11 6
Sale of gas—		
Common gas, at 4s. per 1000 feet. .	£69,194 9 4	
Public lighting and under contracts.	8,830 10 7	
		78,024 19 11
Ditto of residual products—		
Coke and breeze	£17,816 0 9	
Tar and ammoniacal liquid . . .	4,807 12 1	
		22,623 12 10
Miscellaneous receipts		24 15 0
Total income		£112,806 19 3
Ditto expenditure		111,908 10 8
Balance to revenue next year		£898 8 7

EXPENDITURE.

Management—		
Directors allowances	£1,500 0 0	
Salary of secretary and clerks . .	1,270 0 0	
Collectors commission and pay . .	834 17 10	
Rent, rates, and taxes of offices . .	478 6 1	
General charges, including stationery and printing	1,767 13 1	
Payment to auditors	81 8 0	
		£5,932 5 0
Manufacture of gas—		
Coals, including carriage, dues, &c.	£39,802 11 11	
Purifying materials	447 13 8	
Supervision and labour	11,877 18 1	
Stores, tools, implements, ordinary repair, and maintenance of premises	3,993 11 10	
Rents, rates, and taxes of manufactory	1,252 3 5	
		57,373 18 11
Distribution, including service-mains, pipes, and ordinary repair and maintenance . .	£8,060 8 5	
Meters—		
Restoring and replacing	1,286 19 3	
		9,347 7 8
Law and parliamentary charges	£1,225 10 5	
Interest paid from profits, on £66,000 borrowed capital, at 5 per cent.	3,279 8 8	
Wood Street fire	4,750 0 0	
		9,254 19 1
Balance for shareholders profit		30,000 0 0
Total expenditure		£111,908 10 8

III. DIVIDENDS.—*Account of all Dividends actually Paid in the above Twelve Months.*

Balance for shareholders profit, as above	£30,000 0 0	Dividends declared April and October.	£20,000 0 0
		Balance to next year's account	10,000 0 0
	£30,000 0 0		£30,000 0 0

The CHAIRMAN: Gentlemen, I have to move—"That the report and accounts, as circulated among the proprietors, be received and adopted, and that a dividend be now declared at the rate of 10 per cent. per annum for the half year ending the 31st of December last, payable on and after the 28th of May next." I do not think I shall have any necessity to make any lengthened remarks on the present occasion. I think the paragraph in the report which states that the sum available for dividend is £10,898 8s. 7d., and the recommendation which we can honestly and fairly make, that a

dividend of 10 per cent. be declared, will be satisfactory to you, and will obviate the necessity of my making any lengthened statement. However, as it is my custom to run over the accounts and figures, I will proceed briefly to do so. If you will turn to the statement which we have laid before you, you will, I think, consider with me that it is upon the whole very satisfactory. For instance, it is very satisfactory to find that the gas-rental at the reduced price of 4s. is as much as £78,024. If we had had the price of 4s. 6d. which ruled during the preceding year, your rental would be represented at £87,777, compared with the previous corresponding rental of £82,064. As it is, it has produced a rental of £78,024, which is only about £4000 short of the amount at the larger price. This, I think, is a very satisfactory circumstance. Less satisfactory to us, however, is the fact that the sale of residual products has diminished in amount. Last year, by our report, you will find that the sale of residual products was £24,323, and for the half year ending at Christmas, 1866, they amounted only to £22,623, showing a reduction of something like £1700. That is in the face of a larger quantity produced, because, of course, we have carbonized a larger quantity of coal to produce the increased rental. Under ordinary circumstances we ought to have had a larger return for residual products; but the price of coke, tar, breeze, and ammoniacal liquor have ruled, and are still ruling at prices lower than before, and, therefore, we have the diminution shown on this item of the accounts. On the other side, too, we have had to pay a higher price for coals than in the corresponding period of 1865, with which we are comparing. The average price of coal this last year, as compared with the previous year, including cannel, which largely enters into our manufacture, was 15s. 10d., as against 14s. 11d.; so that, in point of fact, there is a difference of 11d. per ton, and, as you are all aware, the tendency is that the price of coal, and especially cannel, is increasing in value. That is a matter which we must face in our manufacture—no doubt it is a very serious matter—and, therefore, it is that we say it is very unjust for Parliament to make a cast-iron rule respecting the price of gas, and that price a very low one, altogether irrespective of the cost of coal, the raw material out of which it is manufactured. The management charges run very much the same as last year. "Supervision and labour" has' slightly decreased, notwithstanding the increase in the manufacture being £11,877, as against £11,913. The ordinary "Repair and maintenance" of premises last half year was £3993, as against £2970 in 1865. That will show that we have not stinted the expenditure in keeping your property in proper repair. It is one of our cardinal points—we take care to keep up the "Wear and tear" of the works, and do not take value out of them to enhance the profits we offer to you. The "Rents, rates, and taxes," are much the same—slightly less. Under the head of "Distribution," including "Service mains, pipes, and ordinary repair and maintenance," we expended last half year £8060, as against £6383 in the corresponding half of 1865; that is, nearly £1700 more, which has principally been laid out in the repair of services. We have made a most careful revision of almost all the services we have down, with the object of relaying them in an improved manner in trenches, supported upon creosoted timber, and filled up with asphalte, to prevent leakage. We have relaid rather more than half the services in this improved manner, and we intended thus to go through and relay the remainder. On this account you have a larger sum to pay under this head, but I think you will consider it an expenditure in the right direction. We have likewise repaired meters to the extent of £1286, as against £869 in the corresponding period of 1865, being an increase of something like £400. There is one item which one always regrets to see in these accounts—viz., "Law and parliamentary charges." They amount this half year to £1225, as against £282 in 1865, and though called "Law and parliamentary charges," I believe they are all costs incurred in Parliament—costs which, in common with other companies, we have been put to in consequence of the attacks made upon us, and which, I am sure, you desire we should meet in the most efficient manner; so that, however much it is to be regretted, you will agree with us that this expenditure is necessary. The result of the whole, gentlemen, is to bring down a balance for shareholders profits of £30,000, which, with the dividends declared before, leaves £10,000, or 10 per cent. for distribution on the present occasion. No doubt the balance carried over to the revenue of the next half year is only £898 8s. 7d., as against a balance of £2133 11s. 6d. in 1865; so that you see we have rather infringed upon the reserve-fund of the previous year. That, perhaps, we should have scrupled to do, because we think the dividend paid ought properly to be paid out of the earnings of the half year, and not made up from the balance of a previous half year; but the directors taking this matter into consideration, and seeing that the awkward sum of £4750 on account of the Wood Street fire appears in the accounts for the last time—seeing also we have made the large additional expenditure which I have referred to during the past half year, an expenditure which will not occur in future—thought they were justified in endeavouring to keep up the usual amount of dividend. With regard to the paragraph in the report which speaks of the pending proceedings in Parliament, the shareholders will expect that the directors are making the most vigorous opposition in their power against the attempt that is being made, I was going to say, by a branch of the Government, no doubt urged on by other parties, to do what is a most flagrant and manifest act of injustice to the rights of property—as much so, indeed, as if they were to propose to the House of Commons to reduce the interest on Consols from 3 per cent. to 2 per cent. In point of fact we all know—and I see some gentlemen present who, sixteen years ago, entered into this enterprise—that it has been conducted on the faith of the Act of Parliament, which guaranted us a 10 per cent. dividend if we could earn it, on our performing certain services to the public. We and our friends and relations, sisters and mothers, have invested our money in the confidence that that provision would not be violated; and therefore we feel that we are bound in every way we can to resent and resist any attempt to break faith solemnly pledged by an act of the Legislature. We have made our voices heard, as I think you will see from the statements which have appeared in the public journals, and no doubt our case will be taken into the serious consideration of Parliament. I do not think there is any reason to fear that Parliament will insist upon reducing our dividends from 10 per cent. to 7 per cent., as proposed by the Government bill. Of course the next thing is to take care that they do not insist upon such a price being put upon our manufacture, that though in theory that reduction of dividend be abandoned, in practice it will become inevitable. If they carry out the next objectionable feature of the bill, and require us to supply 14-candle gas at 3s. 6d., it would be in effect to say, "You shall do that which cannot be done, so as to give your shareholders even 1 per cent. of dividend.' And not only is that so in the existing state of things, but if such a measure were carried and the cost of the raw material from which gas is manufactured goes up, while the price of residual products goes down, we should not only not get any dividend at all, but we should be unable to pay our way. We say, therefore, that it is a most unjust thing to be proposed, but we believe that no committee of the House of Commons, when the evidence is put before them, as it will be probably this session, will agree to it; and we, therefore, think you have no reason to fear but that a fair and substantial measure of justice will be done to the important branch of manufacture with which we are connected. I can only say that we have used our best efforts and shall continue to use them for the defence of your interests and in the prevention of any act of spoliation being inflicted upon gas companies even by Parliament itself.

The LORD MAYOR (deputy-chairman): I have great pleasure in seconding the resolution, and as the chairman has gone so fully into all the details connected with our operations during the past half year, I do not think it necessary that I should trouble you with any observations.

Mr. WREN: If it would not be out of place, perhaps you could give the shareholders some further information respecting the Government bill. I understood it was postponed till the 29th inst., for the purpose of coming to an arrangement with the companies.

The CHAIRMAN: We had a meeting on Tuesday of three hours duration, at which we endeavoured to come to an understanding on the question—such an understanding as this, that the objectionable principles in the bill which I have enunciated should be struck out, and the bill then read a second time, and submitted to the judgment of a committee of the House of Commons, in the usual way. I hope some such arrangement will be come to, for I believe we should be quite safe in the hands of a committee.

Mr. WATSON: I should like to know whether there is anything in the bill to prevent strikes among gas-men.

The CHAIRMAN: I am afraid that can only be done by some general legislation. I hope the Government will consent to this, that the price of gas in the future shall not be fixed and rigid, but that it shall be open to the consideration of the Board of Trade, or some other competent authority, to decide, should the cost of material increase, what additional charge may be made by the companies.

After some further conversation, the motion was carried unanimously.

Mr. WYLD, M.P., the director retiring by rotation, was then cordially re-elected, and in returning thanks said that he felt it his duty, as a member of the Legislature, to do all in his power to preserve the rights and interest of the gas companies, because he believed that those interests and the interests of the community at large were identical. As to the bill of the Government, he felt assured that Sir Stafford Northcote, who had charge of it, had not made himself acquainted with its various sections. It was a bill almost of confiscation, and proposed an entirely new principle in legislation, which a Conservative Government, if true to its traditional policy, ought never for a moment to have sanctioned.

Mr. BADGER moved a vote of thanks to the chairman and directors, which was seconded by Mr. WREN, and carried unanimously.

The CHAIRMAN having acknowledged the vote, the proceedings terminated.

CITY OF MOSCOW GAS COMPANY, LIMITED.

The Second Annual Meeting of the Shareholders of this Company was held at the London Tavern, Bishopsgate Street, on Saturday, April 27—H. WOLLASTON BLAKE, Esq., F.R.S., in the chair.

The SECRETARY (Mr. H. C. Wiss) read the notice convening the meeting, and the following report and statement of accounts were submitted:—

The directors have now to submit to the shareholders a report and statement of accounts, giving the particulars of the various operations of the company during the past year, resulting in the successful opening of the works on the 27th of December last (Russian style), corresponding with our 8th of January, 1867.

In the month of May, 1866, the construction of the buildings and laying of the mains throughout the city were resumed after the previous frosts. During the summer vast quantities of materials, consisting of pipes, gasholders, purifiers, and gas apparatus in general, to an extent of more than 10,000 tons, were shipped from this country; about 106 miles of mains were completed, a large retort-house, capable of containg 800 retorts, was erected, together with coal-stores, purifying-houses, and other buildings; two large gasholders, in substantial buildings to protect them from the severity of the climate, were finished; and the tanks and buildings for two other holders, to be fixed in the present year, were prepared.

The extent and magnitude of these works, which are of the most substantial and and durable description, necessitated the most active exertions on the part of the contractors (before the frost put an end to building operations) to bring them into a sufficiently advanced state to enable the machinery to be fixed for the commencement of the actual manufacture of gas.

From the assurances which the directors received they entertained sanguine hopes that they might have been in a position to supply gas in the month of October, but the early closing of the season, and the difficulties attendant upon so vast a work in the heart of Russia, prevented the strict realization of their wishes in this respect. Before, however, the termination of the Russian year, the fires were placed under the retorts, and during the Christmas week the City of Moscow was lighted with upwards of 2000 public lamps. This event was hailed as one of the greatest interest and importance by all the inhabitants, and was the occasion of great solemnities, illuminations, and rejoicings, in which the Governor-General, the Prince-Mayor, and all the leading authorities took an active part.

The opening of the works and the lighting of 3000 public lamps entitled the company to be recognized as the actual holders of the concession, and to have it transferred from the names of the original concessionaires. The legal formalities which had to be observed, and the procuring of the official assent of the municipality of Moscow, as well as of the Minister of the Interior, to this transfer, occupied much time; but the directors have the pleasure of announcing that all the necessary documents have been executed, and that all the rights conferred by the original concession are now vested in the company. This concession granted exclusive privileges to light the city within certain limits, but it left the company open to competition in the suburbs and several important manufacturing districts. It was felt by your board to be most desirable to have the privilege of lighting these excepted portions of the city, and for that purpose they presented the necessary petition, and, although strongly opposed by parties who likewise sought similar privileges, your directors succeeded in their application. This result was consequent on the satisfaction which the great exertions of this company had given to the city; and your board have the pleasure of congratulating the shareholders on this most important addition to their rights, whereby the exclusive privilege is now conferred on them, not only for the central portions, but also for the whole city, and all possibility of competition or interference is for ever removed during the continuance of the concession.

The profits and advantages to this company arising from the privilege now obtained will greatly exceed those that would have attached to the competitors who, nevertheless, sought to obtain them, as any others would have had to erect works, and provide a very extended system of mains; whilst the establishment of this company is sufficient for the requirements of the whole city, the principal mains are of ample dimensions, and all the suburbs can be reached at only a comparatively trifling outlay for pipes, all springing from the central system, and adapted to the consumption of each district, which in many parts promises to be very large.

In regard to the lighting of private houses, magazines, factories, and other establishments, considerable progress has been made during the last three months, at the same time difficulties have been experienced in fixing the internal fittings and making the connexions with the mains. The introduction into Moscow for the first time of the necessary number of gas-fitters has been by no means easy, and the consumers were unwilling during the greater part of last year to permit their houses to be entered, and their walls broken into until they were satisfied that gas would, at the period named, be supplied, of which, from the magnitude of the work o be executed, they entertained considerable doubt. In addition, however, to the

public lights, the company has, within the ten weeks which have elapsed since the opening, connected about 14,000 private lights, and nearly 5000 more burners have been fitted, but cannot be connected with the mains till the frost leaves the ground. Applications are on the company's books for upwards of 50,000 additional lights, the fitting up of which will be vigorously prosecuted during the summer. Many of the large Government buildings are to be fitted with gas; the Foundling Hospital alone will require nearly 5000 lights, and the municipal buildings about double that number.

Fears were at one time expressed that the extreme cold occasionally experienced in Moscow might so interfere with the illuminating power of the gas, from the effect of condensation, as to render it at times unserviceable; it is, therefore, gratifying to be able to set this question at rest at a very early period. Within one month after the opening, the severity of the weather exceeded anything that had been known for many years; the petroleum in the public lamps was frozen, and the streets in which that mode of lighting was adopted were in darkness, whilst the gas continued to burn without interruption.

The prospects of the company, therefore, as regards the future demand for gas, are most encouraging, and far exceed what might have been anticipated, from the example of other cities on the Continent, where, nevertheless, the results obtained have fully realized the hopes and expectations of the proprietors.

The appointment of the auditors being annual, C. F. Kemp, Esq., and T. R. Peill, Esq., retire, and, being eligible, offer themselves for re-election.

Statement of Accounts, December 31, 1866.

Dr.				*Cr.*			
To Capital account—				By Amount of certificates for work executed and invoices of materials delivered in Moscow—			
Amount received on 23,295 shares	£582,256	0	0	As per statement, Dec. 31, 1865	£137,762	0	2
Ditto on 1705 shares forfeited	10,100	0	0	Ditto Jan. 1 to Dec. 31, 1866	406,773	4	8
	£592,356	0	0			£544,535	4 10
Less calls in arrear	46,635	0	0				
		£545,721	0 0	Meters, tubes, and internal fittings sent to Moscow for sale to consumers—			
Loans		109,631	11 11	As per statement, Dec. 31, 1865	£8,055	18	7
Bills payable		106,265	16 11	Ditto Jan. 1 to Dec. 31, 1866	64,084	2	6
Credits at Moscow on account of works		24,000	0 0			72,140	1 1
Debentures issued to date		30,356	0 0	Amount lodged with the authorities at Moscow as caution-money		52,000	0 0
Amount due to contractors and sundry creditors		13,158	16 6	Interest on calls—			
Interest—for amount due to shareholders on calls		11,611	9 7	As per statement, Dec. 31, 1865	£6,092	17	9
Transfer-fees—				Ditto Jan. 1 to Dec. 31, 1866	29,970	12	9
Amount received as per statement, Dec. 31, 1865	£52	10	0			36,063	10 6
Ditto Jan. 1 to Dec. 31, 1866	24	5	0	Interest on deposit, loan, and commission accounts—			
		76	15 0	As per statement, Dec. 31, 1865	£1,366	10	7
				Ditto Jan. 1 to Dec. 31, 1866	6,739	15	11
						8,106	6 6
				Preliminary charges, including surveys, travelling, and incidental expenses connected therewith—			
				As per statement, Dec. 31, 1865		25,428	0 0
				Amount remitted to agents and managers in Moscow for engineering and other current expenses to be accounted for		17,625	4 3
				Amount remitted to Moscow for the purchase of land on which to erect the company's works		14,059	18 2
				Coal forwarded to Russia, freight, &c.		50,052	16 11
				Law expenses, as per last statement		574	8 4
				Office furniture and fittings in London and Moscow—			
				As per statement, Dec. 31, 1865	£298	11	11
				Ditto Jan. 1 to Dec. 31, 1866	535	7	6
						833	19 5
				Salaries, rent, directors remuneration, and sundry other expenses in London—			
				As per statement, Dec. 31, 1865	£3,380	11	4
				Ditto Jan. 1 to Dec. 31, 1866	3,932	4	4
						7,312	15 8
				Salaries, rent, travelling expenses of managers, workmen, and others, wages, &c., in Moscow—			
				As per statement, Dec. 31, 1865	£818	19	3
				Ditto Jan. 1 to Dec. 31, 1866	8,880	6	7
						9,699	5 10
				Postage, telegrams, bill stamps, advertising, printing, stationery, &c., &c., in London and Moscow—			
				As per statement, Dec. 31, 1865	£1,154	1	7
				Ditto Jan. 1 to Dec. 31, 1866	1,181	5	3
						2,335	6 10
				Cash in office		54	11 7
		£840,821	9 11			£840,821	9 11

The CHAIRMAN, in moving the adoption of the report, congratulated the proprietors on the progress the company had made during the past year, on the satisfactory condition of the extensive works they had undertaken for the lighting of the city of Moscow, and on the fact that they had secured for themselves the exclusive privilege of supplying gas to the suburban districts. Passing from the consideration of the state of the works and the immediate prospects of the company, as detailed in the report, he said there were several points which he should like to say a word or two upon, with a view probably to save the time of the meeting, and of anticipating certain questions which would be asked in reference to the accounts, so that the proprietors might be perfectly acquainted with all the circumstances connected with the company. If they would be good enough to turn to the accounts, they would perceive the first item on the debit side was "To Capital account," and under that head there was an amount of £46,635 put down for "Calls in arrear," and £10,100 for 1705 shares forfeited. He might mention, in reference to the latter item, that no shares were forfeited until it was clearly ascertained by the board that from circumstances which had arisen, owing to the great pressure of last year, certain shareholders were so affected that they were utterly unable to meet the calls. That being the state of the case, of course there was no alternative, except to forfeit the shares. The sum total that was due to the company, under the head of "Forfeited shares," and "Calls in arrears," amounted altogether to £80,000, of which £46,635 was for calls in arrear, and £10,100 for 1705 shares forfeited, less the value received upon those shares. Of this sum £49,000 had been received since the 31st day of December, the date of making up the accounts.

A SHAREHOLDER: Will there be much loss to the company?

The CHAIRMAN said he might mention that of the calls in arrear, about £21,000 had been paid up, and most of the forfeited shares had been issued at such a price that there would be little or no loss to the company. The sum total to be received upon them was £32,000, and the company had actually received between £27,000 and £28,000 while they had still some to be disposed of. He believed the company would realize the full amount upon them within £1000 or so. The next two items which appeared to call for remark came under the heads of "Loans, £109,651," and "Bills payable, £106,265." It so happened that the time at which the accounts were made up—viz., the 31st of December—was exactly the time when the largest possible amounts were due for coals and fittings, and the various other descriptions of goods sent out, and likewise the largest amounts due to the contractors for works done in the summer. But he might mention, on the other hand, that the company had assets, a proportion of which had been realized, to meet these sums. If the proprietors would refer to the other side of the account, they would perceive there an item for "Meters, tubes, and internal fittings sent to Moscow for sale to consumers, £72,140." These would be sold at a profit to the company of from 10 to 15 per cent.; and an arrangement had been made by which the whole of these things would be taken off the hands of the company at that profit. There was, therefore, here an asset of a large amount; besides which, there was the caution-money lodged with the authorities at Moscow, £52,000; and the company had a very large stock of coals, amounting in value to £50,052, which was much more than was required, and more than the directors would have sent out, had they been aware that the works could not possibly be opened until the beginning of this year. From the advices they received, it seemed to them possible that the works might have been opened in October, and therefore a large stock of coal was sent out. There was, however, £30,000 or £40,000 more than need for the future be locked up in coals.

A PROPRIETOR: These amounts you will have to transfer to revenue.

The CHAIRMAN said the profit would go to revenue. He might mention, in addition, that on the debit side of the account there were "Debentures issued to date, £30,356." That ought more properly to be printed, "Received on debentures." There were about £30,000 worth issued at that time; since then there had been issued about £40,000 worth more. The result of the accounts was, that though the liabilities on the one side appeared to be large, there were various assets, consisting of calls in arrear, forfeited shares, meters and fittings, caution-money, &c., to the extent of £316,000 against liabilities on the other side, which were represented by the sum of about £250,000. Of course all these various bills had been met, and arrangements had been made by which in the event of the assets which the company had on the one side not coming in quite so fast as the demands upon them required during the year, they would have such credits as would enable them to make everything meet, and the directors had entered into perfectly satisfactory arrangements for carrying out everything that remained to be done for the year, and for completing the whole of the works. He might further mention that the works would be completed, capable of supplying gas for 120,000 lights, within the estimate of the original prospectus. The estimate was £875,000, and he believed the actual cost would not exceed £800,000, which would be made up by the debentures issued, and by the share capital already raised. He thought he might just say, with reference to the debentures, that if any gentleman present wished for an exceedingly good security at a high interest, and yet an interest which it was worth the while of the shareholders to pay, he could not do better than take some of the 8 per cent. debentures of this company, which were adapted either to this market or to the markets abroad. They were payable to bearer, and secured upon such a property as the company possessed, and such an income as they would be receiving. In conclusion, he had only to say that, so far as the prospects of the company were concerned, they could not possibly be doing better. They had a most extraordinary demand made upon them for lights, but, of course, in a city where hitherto there had been no fitters it required time before the necessary arrangements could be made. They had, however, actually fitted up and lighted, in this the first year of their operations, as many lights as it took 10 or 15 years to obtain in the town of Milan, which was one of the most profitable stations of the company supplying it. At St. Petersburg, after four ,or five years operations, the company had only about 60,000 lights,

whereas this company had already fitted up 20,000, and had applications for 60,000 more. He thought, therefore, it was hardly possible for any company to have prospects of greater success than this. Every one acquainted with the manufacture and supply of gas knew that it took one or two years to get the people accustomed to it, and to get their houses fitted up. It was always difficult, too, to get manufacturers to change their system of lighting. Moscow was peculiarly situated for the supply of gas. The factories were constantly in operation, and the *cafés* open day and night. The opera house expended £13,000 a year in lighting, and therefore there would be a considerable income from that source. As far as he could see, and he believed it was the universal opinion of persons connected with gas works, nothing could exceed the rapidity with which these lights were being forced upon them.

A PROPRIETOR asked what, in English money, the directors were charging per 1000 feet for gas, and what price they obtained for the public lights?

The CHAIRMAN said he might just mention that the price they were at liberty to charge was five roubles or 12s. 6d. per 1000; but the price actually charged was four roubles, or about 10s. 6d., according to the exchange. He might also mention that the price at which they could make gas was such that, taking into consideration the probability, in a cold climate like that of Moscow, of obtaining an abundant sale for coke at a good price, the company would receive something like 60 per cent. or more upon all their receipts in profits—between 60 and 65 per cent. For the public lights, of which they had now fitted up 2000, and would have another 1000 in the course of this year, they received a rouble and a half—*i.e.*, about 3s. 9d. or 4s. per 1000 cubic feet—which was more than the cost of the gas to the company. They had not, however, calculated upon any profit upon the public lighting, and that was exactly the payment the company made for the privilege conceded to them of lighting the whole town. Practically they made them a present of the lights without profit; there was no loss upon the supply, and probably the money received was about 6d. per 1000 feet more than the gas cost. He might also mention that the number of private lights, as compared with the public, was as 20 to 1. With these observations he moved—"That the report and accounts now presented be received and adopted."

Mr. DRAKE seconded the motion.

A PROPRIETOR asked who the competitors were with the company for the concession to light the external parts of the city—whether they were Moscow or English parties.

Another PROPRIETOR asked whether the Foundling and municipal lights referred to in the report were included in the public lighting which the company were charging so low a price for.

The CHAIRMAN said they were all private lights except those in the street-lamps.

Mr. KNIGHT said he had listened with considerable interest to the statements made by the chairman as to the past, present, and future of the company, and as an original shareholder, who had paid 20s. for every £1 he held, it would readily be believed that he felt very anxious to see the company prosperous. There were one or two questions he desired to put in order to satisfy his mind. In the first place, he would ask whether the new concession was for the same period of 25 years as the original concession. In the next place, he found it stated at the bottom of the debtor and creditor account, by the auditors, Messrs. Kemp and Peill, that they "have compared the annexed account with the vouchers and London books, and find it to be correct." He (Mr. Knight) supposed there were some books kept in Moscow, and he would like to be informed whether any examination of those books had been made, so that the proprietors might know what guarantee they had for their correctness. The chairman had congratulated them that they were now in possession of all the rights conferred by the original concession. No doubt that was a matter, *primâ facie*, of considerable gratification, and he (Mr. Knight) was about to put a question because he believed the chairman could give a satisfactory answer to it, and because he believed the answer would have the effect, which they all desired, of enhancing the value of their property. It was stated in the report that the opening of the works and the lighting of 2000 public lamps entitled the company to be recognized as the actual owners of the concession, and to have it transferred from the names of the original concessionaires. Now, he happened to be a shareholder in a company which was established to light a town in a distant part of the world, by whom those words might have been strictly used, and yet it so happened that the concession, so far as the public lighting was concerned, was absolutely worthless, for the company had no power to enforce payment for the gas supplied. Perhaps the chairman would tell the meeting whether such a calamity could possibly befall this company.

Mr. ROWSELL inquired what further amount of capital would really be required. Of course, the works were likely to go on for some time, but it was desirable to know whether any further large amount of capital would be required.

The CHAIRMAN, in reply to the honourable proprietor who asked who were the competitors with the company for the lighting of the suburban districts, said one of them was a company at Moscow, called the Portable Gas Company, who had had works for the supply of a certain quantity of portable gas for several years there. That company was, practically speaking, defunct, this company having got a large proportion of their consumers from them They, however, did apply for the right to canalize that portion of their district which was an excessively good one, in opposition to this company. There was also a combination of foreigners who made a proposition for the purpose, but both were unsuccessful. With reference to the inquiry as to the duration of the new concession, it was exactly on the same footing and for the same time as that for the internal portion, the utmost limit of which was forty years. There were certain conditions as to thirty years, which, however, would never be acted upon, as at the end of thirty years the price to be paid to this company was a very large one. As regarded the books, he might say that the company's books at Moscow were kept with the greatest possible care; but as the accounts now presented were made up to the 31st of December, it was very difficult to get over the large mass of vouchers which, during the execution of the works, must necessarily be given, in time to compare them. They were all here now, and he (the chairman) believed would be found strictly correct. As to the possibility of any trouble arising in reference to the payment of money, he did not think there was any possibility of the kind. The terms of the concession required that the original concessionaires should not absolutely transfer the concession to any one until the lighting of 2000 lamps was accomplished. They had entered into every possible arrangement with this company that they would do so—therefore the company were comparatively e—but it was a gratifying thing to know that they were now recognized the holders of the works by the Government, and were capable of enforcing payments of their demands. As to the question of capital, he had already mentioned that the company had actually in assets a very considerable sum more than required to meet their liabilities—some £50,000 or £60,000. There was no doubt they calculated on issuing a certain quantity of their 8 per cent. debentures, spread over this year and part of the next. The total payments spread over this year to complete the canalization was about £60,000, but the directors had made such arrangements that they felt no anxiety on this score at all.

Mr. OXENHAM said he understood the question put Mr. Knight to refer to the enforcing of the claim of the company to payment for the public lighting, supposing any difficulty was likely to occur.

The CHAIRMAN said he could not suppose such a contingency was likely to occur. They had now been at work for three months, and they were paid every month. When the account was rendered the authorities were bound to pay it in ten days, and, he presumed, if they did not do so the company could put out the lights.

Mr. OXENHAM said in another company to which he and Mr. Knight belonged there was no power to enforce a settlement for the public lights, through some fault in the original concession.

The CHAIRMAN said he was glad the question had been mooted, as it enabled him to state that they possessed every right which any company in Russia possessed. They had the power to sue and be sued, and, possessing those rights under a specific and distinct contract, he presumed they would have no difficulty in enforcing their claims at law.

A PROPRIETOR inquired what was the cost of coal.

The CHAIRMAN said the cost was estimated at, and probably would amount to 40s. a ton laid in at Moscow—possibly it would be only 37s. or 38s.—dependent upon being carted in what they called "turn waggons."

A PROPRIETOR: What is the price of coke?

The CHAIRMAN said at present their experience was limited. As the climate of the place was cold, it was believed that coke would fetch a good price, and was estimated at between 40s. and 50s. by persons there. It required time for persons to get used to it before the company could realize a large sale; but when he mentioned that at Milan, a much hotter place, and where coal only stood the company in 44s. a ton delivered, the price of coke was 54s., he thought they would see the prospect of a profitable sale was very good. At present not wishing to keep a large stock, but desiring rather to induce people to begin to use it, they had been selling coke at prices varying from 35s. to 40s.

A PROPRIETOR, who said he was an original shareholder and a debenture holder, remarked that he did not at all anticipate any difficulties of the kind referred to by Mr. Knight. What weighed with him in taking up shares was, that the credit of the Government and of the Russian community was staked to the company, and they were not likely to act in a dishonourable manner. As to the completion of the works, it seemed to him not probable the company would issue the remainder of the shares, whereas they must raise more capital. At present they were raising it on debentures at 8 per cent., and he wished to know from the chairman whether these debentures would be further offered to the shareholders, and whether any time could be named during which the shareholders would be certain to obtain a proportion of these debentures before the whole were issued.

Mr. KNIGHT, in explanation, said he did not desire at all to convey the thought that he was at all uneasy about the settlement of the company's claims for the public lighting; it was quite the reverse.

The CHAIRMAN said any shareholder was at liberty to apply, and take debentures till the extreme limit which the directors thought right was reached. Of course, when necessary, the directors would take measures to issue debentures to the public, probably in the foreign market. At present there was no great urgency; the directors saw their way, out of existing assets, to meet all they had to do, and he had no doubt they would be able to issue debentures as required, but they would not encumber the capital account more than was necessary. The prospects of the company were so exceedingly good that he believed they would be able to pay a very high dividend in the course of two or three years from this time, and a reasonable dividend in the mean time, so that it was really a great advantage to the shareholders that a certain proportion of the capital required should be raised on debentures.

A PROPRIETOR remarked that there had been some changes in the direction, and probably the chairman could give the meeting some reason for the retirement of gentlemen whose names had appeared in the original prospectus.

The CHAIRMAN said he regretted to state that the continued illness of Mr. Hawkins had compelled that gentleman to resign; Mr. Croly had been obliged to go to Moscow, and having been absent seven or eight months, had sent in his resignation; and another gentleman—a Russian—had also retired. The places of those retiring had all been filled up by persons holding a large stake in the company.

A PROPRIETOR asked how the company would fare in the event of war with Russia.

The CHAIRMAN supposed they would not take the company's works, and the inhabitants would still want gas. When war occurred in Italy, the company at Milan, with which he was connected, supplied more gas than usual. He did not at all imagine that if war arose between England and Russia the Government of the latter country would confiscate the works of the company.

Mr. HALLETT thought the result of a war rather depended upon the stock of coals maintained by the company.

The CHAIRMAN said if a contingency of the kind arose there were certain articles in the concession which entitled the company to charge a higher price for gas. At present they had a sufficient stock of coals for the next twelve months, and as a further security he might state that coal had recently been discovered in Russia, within 150 miles of Moscow.

After some further conversation, the motion for the adoption of the report was put and carried unanimously.

The retiring auditors, Messrs. Kemp and Peill, were re-elected, and Mr. Kemp, on behalf of himself and colleague, returned thanks.

A cordial vote of thanks was presented to the chairman and directors for their attention to the business of the company.

The CHAIRMAN, in acknowledging the vote, referred to an observation which had been made by an honourable proprietor, as to the desirableness of having half-yearly meetings, and said the Articles of Association provided that the meetings of the company should be annual, and he did not think it would be of advantage to hold meetings at which no business could be done. But he could promise the proprietors that they should be kept well informed as to the position of the company, and that they should have a half-yearly report. On behalf of his colleagues and himself, he had to thank the meeting for the vote they had been pleased to pass, and to assure them that their interests being identical with those of the proprietors at large, the directors were doing all in their power to bring the undertaking to a successful issue.

IMPERIAL AUSTRIAN GAS COMPANY, LIMITED.

The Third Ordinary Meeting of the Shareholders of this Company was held at the Offices, No. 60, Gracechurch Street, on Monday, April 15th—W. F. Dobson, Esq., in the chair.

The Secretary (Mr. James Milne) having read the advertisement convening the meeting, the following report and statements of accounts were presented:—

The directors having been requested by one of the largest shareholders of the company to convene a special general meeting for the purpose of taking into consideration certain propositions to be found at the end of this report, have decided upon holding this ordinary general meeting at an earlier date than contemplated by the Articles of Association for the annual general meeting, considering that the convenience of the shareholders is best consulted by holding the ordinary and special meetings on the same day.

The directors had intended to call the ordinary meeting at the time prescribed in the Articles of Association, viz., July, believing that the negotiations with the contractor for Baden, which are not complete at present, would before then have been adjusted. The directors are glad, however, to take the opportunity of making a report of the state of the affairs, and to submit a balance-sheet of the accounts of the company.

The engineer of the company, Mr. Hawksley, strenuously urged upon the directors the importance of surrendering to the vendors the works of Kronstadt, as almost an absolute reconstruction was necessary to place them in the state contemplated in the contract between the company and Messrs. Keyworth and Porter. In consequence of this advice, the directors felt themselves compelled to surrender the works and concession of Kronstadt into the hands of the vendors, receiving in exchange such a number of fully paid-up shares of the company as, added to 500 shares with £5 paid surrendered by Mr. Maw, are equivalent to all the sums paid for the works and concession of Kronstadt.

The return of shares to meet errors of population and a reduction in the sum for the concessions, brought to the notice of the shareholders in the last report, has been carried out, and the result of the arrangement is, that whereas the total sum contracted to be paid for the concessions for twelve towns was £24,750, the actual amount now paid (Ischl being abandoned) in fully paid-up shares is £17,215 4s. 4d.

Under the contract with the concessionaires the company covenanted to pay in cash £2790, the amount of the various sums deposited with the municipal authorities as caution-money to ensure the due fulfilment of the terms of the concessions. On this account the company had paid in cash £1626 9s., and by a subsequent arrangement with the concessionaires, the balance has been taken in 138 shares.

The caution-money deposited at Baden, to the extent of 7000 florins, has been returned, and the company are entitled to a return of the 6000 florins deposited at St. Pölten. The municipal authorities of Wels, Znaim, and Gorz have declared the caution-moneys forfeited on the account of the works not being erected in the time stipulated.

The directors are satisfied that if funds could be obtained to erect the works even in a partial manner in any or all of the towns, the caution-moneys may be restored, so anxious are the authorities to have their towns lighted with gas.

The directors have not been able to arrange a settlement of the amount to be paid for Baden. The offer made to the contractor has been declined, and he has declared his intention of submitting a case to the arbitrator appointed in the contract, viz., Mr. Hawksley, the engineer. The directors have had possession of the works for nearly fifteen months, during which time an average rental of £100 per month has been obtained.

The works at St. Pölten may be considered complete, but a second gasholder will have hereafter to be added as the consumption of gas increases. The cost of the works, including the concession, has been £9575 2s. 10d. They have also been in full operation for fifteen months, during which time an average monthly rental of £72 has been obtained.

The idea entertained at the last meeting of leasing the works at St. Pölten and Baden has on further consideration been abandoned as less advantageous to the company, and the return of Kronstadt to the vendors having set the company's manager there (Mr. Willien) at liberty, he has been placed in charge of the works at these places with every expectation and conviction that the management of both can be efficiently and economically conducted by him.

The directors have been compelled to dispense with the services of Mr. English, their resident engineer in Austria, as their inability to obtain funds to erect works at the other towns prevents them finding employment for him; but they part with him with regret, and with a full appreciation of the valuable services he has rendered to the company.

The arbitration under a judge's order of the matters in difference between the company and their contractor, Mr. Maw, has been terminated, and an award made and carried out, by which the whole of the shares held by Mr. Maw have been surrendered, and £1250 in debentures and £350 in cash and bills have been handed to him for work absolutely done by him previous to the determination of his contract.

Under the arrangements above alluded to 2738 shares have been cancelled, and the capital reduced by the sum of £68,200.

In the works of St. Pölten and Baden the company are in possession of a nucleus for carrying on works in Austria, and the directors repeat the assurance that the company may still be made successful if more capital can be introduced into it to extend its operations and to distribute the general charges over a larger field.

The directors have devoted very much time and application to the interests of the company. Many very serious difficulties have been overcome, and the operations of the company, though spread over a much more limited area than the directors had hoped, are now upon a sound basis, and may be conducted so as to realize a dividend upon the capital invested.

The directors not having been paid any portion of the minimum remuneration, provided by the Articles of Association, for their attendances since Dec. 31st, 1865, a large majority of them have relieved the company from all liability in respect of their claims, by taking paid-up shares at par for the same, thereby freeing the funds of the company from pressure in this respect, and leaving them available for other purposes.

Under the Articles of Association, all the directors now retire from office, and the shareholders have to elect directors to carry on the management of the company; the present directors are all eligible for re-election, viz.:—Messrs. George Bulkley, C. F. Collier, W. F. Dobson, J. R. H. Keyworth, W. S. Suart, and Henry Young. The following duly qualified shareholders have given notice of their desire to be elected as directors, viz.:—Messrs. Somerset Beaumont, Edmund Pontifex, and T. H. G. Schacht.

The auditors, Mr. William Cash and Mr. William Marshall, retire, but offer themselves for re-election.

The transfer-books will be closed, preparatory to the meetings, from the 10th to the 15th inst. both days inclusive.

Balance-Sheet, March 30, 1867.

Dr.				*Cr.*		
To Capital—				By Cash at bankers in London and Vienna		£580 12 6
2391 shares of £25 each	£59,775 0 0			Baden Gas-Works, including concession		18,019 14 2
Less arrears	4,400 0 0			St. Pölten Gas-Works		9,575 2 10
		55,375 0 0		Concessions and caution-money		18,718 19 7
Debentures		1,250 0 0		Gas-meters account—		
Bills payable		100 0 0		St. Pölten	£494 9 4	
Sundry creditors		1,467 0 6		Baden	177 16 4	
Contractor for works at Baden		5,500 0 0				672 5 8
Interest during construction—				Sundry debtors		107 12 0
Unpaid warrants		282 18 3		Office furniture		163 0 6
Baden working account, to Feb. 28, 1867	£108 5 0			Interest during construction, and difference on shares taken instead of cash		4,755 10 4
St. Pölten ditto ditto	202 14 7			Engineering expenses		2,766 16 0
		310 19 7		General charges—		
				Directors fees	£3,583 12 9	
				Salaries—		
				In London	£901 14 4	
				In Austria, including travel. expenses	800 0 0	
					1,701 14 4	
				Law charges, &c.	750 4 0	
						6,035 11 1
				Preliminary expenses		2,890 13 8
		£64,285 18 4				£64,285 18 4

The Chairman said the report of the directors spoke most fully of almost all matters connected with the concern. There seemed to be some inclination on the part of the shareholders towards a change at the board. All he could say on behalf of the directors was that, if it were meant by this attempt to impute that they had been guilty of any dereliction of duty, they could not assent to the principle. They had acted to the best of their judgment, and for what they believed to be the interest of the company; they had had difficulties to contend with which at one time seemed insurmountable, but they had overcome them, in his opinion, in the best possible way. There could be no objection to the principle that those who were most largely interested in any company should be the persons to take the helm of affairs, and control the business of the concern. With reference to the balance-sheet now presented, he would state that it had been made up by Mr. Cash (one of the auditors), without the least interference on the part of the directors, simply from the books of the company; and he (the chairman) on the part of the directors, challenged any investigation of those books. They had been kept in the most careful manner, and he believed Mr. Cash would tell them they would bear comparison with the books of any company in London. Probably in the balance-sheet there were some items which required a little explanation. On the debtor side it would be seen that the number of shares in the company, which at the last general meeting stood at 5057, had been reduced to 2391. They had been reduced simply in this way. The shareholders would remember on the last occasion the directors told them that the Kronstadt works were in a very unsatisfactory position, and they were urged by Mr. Hawksley, in consequence, to hand them back to the contractors, they not being in such a condition as the directors deemed they should be under the contract between them and the vendors. They accordingly took back in shares the full amount paid in reference to Kronstadt distinctly, with one exception—viz., the sum of £500 paid to Mr. Bradley for the examination of the works. Mr. Keyworth thought that this was not within the terms of the agreement with the directors that the vendors should repay everything expended distinctly upon the works, and probably he was right; but the directors as a body did not take that view, and therefore, with the exception of the £500, shares had been surrendered to the company to the full extent of the money so expended. With reference to the Baden works, the shareholders would see a sum of £18,019 14s. 2d., including the concession, was entered on the credit side as having been paid for those works. That was all that would be paid, supposing Mr. Porter got all he claimed. Of this sum, £16,000 was for the Baden Gas-Works themselves, the £2019 14s. 2d. extra being in reference to the concession. Of the £16,000, the shareholders were told in the last report that £9000 had been paid—viz., £4500 in shares and £4500 in cash. The proposition which the directors submitted to Mr. Porter in November last, and which they deemed most equitable, was that the amount should be reduced to £14,000, the difference being made up generally of moneys paid on his account—£750 of which was not disputed—in respect to the caution-money paid at Baden, £600 for other works which the directors had expended, and that £1900 should be paid to him in shares, making a total of £14,000 for these works, of which £6400 would be in shares and £7600 in debentures. Of the £4400 which appeared on the debtor side of the balance-sheet under the item "less arrears" on capital, this £1900 formed a part. If taken in debentures, it would be taken out of the sum of £5500 which appeared below as due to "contractor for works at Baden," so that that item would be reduced to £3600. The directors had already informed the shareholders that there was a dispute between them and the concessionaires with respect to the concession and caution-money. That dispute had been settled by the only mode in which they could settle it. They had no cash to pay, and so they agreed to give three shares for one for the balance due, and this was the item on the credit side, "Interest during construction, and difference on shares taken instead of cash, £4755 10s. 4d. The interest that had been paid during construction was £2130 10s. 4d., and the amount paid in shares in lieu of cash, which the directors could not pay, was £2625, those shares being taken at par—three for one. With regard to the engineering expenses, the shareholders were aware that the sum of £2000 in shares was paid to Mr. Hawksley, and the sum of £506 to Mr. Bradley for examining the Kronstadt works; these charges were the same as last year. The next item, "General charges—directors fees," he believed these were all in the last year's account, except the amount of fees from January to the 21st of March. The directors had taken no fees since 1865, and he understood there was some objection to the mode in which the directors intended to pay themselves—viz., by taking shares at par. Now, if it were true that the shares of the company were worth little, the shareholders ought to thank the directors for taking them in lieu of fees; because it not only relieved the company of a burden, but increased the interest of the directors in the concern. But if the shareholders thought the directors ought to have money and not shares, they would be happy to take debentures instead of their fees. The other items in the account did not require comment. The item "Law charges" was wrongly put, because £280 of it was for rent. The "Preliminary expenses" had been gone into in both previous balance-sheets. He had little more to say, except that he should

be ready to answer any questions that might be put to him. He might state that the reason why he occupied the chair on this occasion was that Major Suart had met with an accident from an explosion of gas, and his medical man forbade his leaving home for fear of erysipelas. Had he been present he would have given the meeting much fuller information. In his absence, he (the chairman) would say for him that he had worked like a slave, and he believed the thanks of the shareholders were due to him for his services. In conclusion, he moved—"That the report be received, approved, and adopted."

Mr. BULKLEY seconded the motion.

Mr. LAKE said he appeared, not only as a shareholder, but as the representive of a large number of shareholders, and he desired to ask one or two questions. In the first place, he referred to the fact that the directors had issued shares at a discount of 66 per cent., and he wished to know whether, in point of fact, debentures were offered to those persons who had claims upon the company, for cash. Because it was obvious that, if they would take debentures at the same rate as Mr. Maw did, it would have been much more expedient for the company, so that the amount paid in cash for balance due did not exceed by a large amount the sum paid. The next question was, whether the directors had any information other than that given in the report, in which they stated—"The directors are satisfied that if funds could be obtained to erect the works, even in a partial manner, in any or all of the towns, the caution-moneys may be restored, so anxious are the authorities to have their towns lighted with gas." He would be glad to know upon what that satisfaction was based—whether it rested upon any correspondence with the municipal authorities.

The CHAIRMAN said the whole tenor of the correspondence with the municipal authorities was that they were extremely anxious to have their towns lighted with gas.

Mr. LAKE said he asked the question, because he wished to know why the authorities were not willing to return the caution-money. In reference to Wels and Gorz, it was the more remarkable, because, in their first report the directors said they had made arrangements for carrying out the terms of the concession, independent of the dispute with Mr. Maw. In reference to the paragraph in the present report, which stated that the directors had taken paid-up shares at par in lieu of fees, he could hardly imagine how such a thing could be done after what took place at the last meeting. Major Suart then said that the directors did not intend to take any remuneration till the company were in a condition to pay a certain dividend. He (Mr. Lake) felt at the time that the directors were disarming all opposition by that statement, and, therefore, he was much surprised to read this paragraph in the report. He had made inquiries in reference to the recollection of other shareholders, and he found they were unanimous upon this particular point. He should be glad to know whether, the attention of the board being directed to what then took place, they would persist in that paragraph. Turning to the accounts, the item which struck him as the most serious was the fourth on the credit side, from which it appeared that £18,718 19s. 7d. had been paid for concessions and caution-money. The whole of that money, he supposed, might be said to be wasted, and there was no explanation given as to whether any attempt had been made to get an extension of time, as had been done in other companies. In the report of last year he noticed that some money had been paid for extensions of time, but whether it had been done in all cases the directors gave no information. The next question was as to the policy of entering into arrangements involving the payment of £18,718 until the directors knew that they had the money to pay with. The result was the company had lost a very large amount, so that, in the opinion of their engineer, the consideration received for £60,000 was scarcely worth £20,000. Mr. Hawksley, in a letter which he had received, said: "It appears to me that the company have in works about £20,000 value for more than £60,000 of capital; the remainder has gone in other ways not productive of revenue. Under these circumstances, I consider the position of the company can only be relieved by a reduction of the charges upon the undertaking. I am willing to adopt any course you like." Mr. Hawksley had always acted in an open manner, and he (Mr. Lake) would ask the secretary to read a letter addressed by Mr. Hawksley to the company, offering to give up the whole of his remuneration. The board seemed to think there was some *arrière pensee* on the part of Mr. Hawksley in writing this letter, and therefore they simply acknowledged its receipt, instead of having the 80 shares allotted to him given up to the company, which he offered to do. With reference to the concessions, the company had paid about £18,000 in money, and he (Mr. Lake) would like to know whether any claim had been or could be made against the vendors of those concessions, as scarcely anything had been received on this account. It seemed to him that the directors might fairly call upon the concessionaires to take back the concessions and cancel their shares, or else that they ought to adopt some method to get an extension of time for the company, so that some value might ultimately accrue from the arrangements. He thought it was a subject for consideration how far those shares were properly standing upon the register, and how far it might be possible to cancel them or have some remedy against the concessionaires. The chairman had referred to the desire of some of the shareholders to remove the present board. This desire arose not from any default in the present directors, but because the new directors it was proposed to introduce were willing to work without any remuneration, so that the change was obviously for the interests of the company. There were many points in the report which made it impossible for the shareholders to adopt it in the absence of further information. He therefore moved, as an amendment—"That all the words in the resolution after the word 'received' be omitted."

Mr. RITA seconded the amendment.

The CHAIRMAN said, with reference to the concessions and caution-money upon which Mr. Lake seemed to lay much stress, the directors thought that a great deal had been done. The original cost price of the concessions was £24,750. This amount had been reduced by the return of shares to meet errors of population, claimed at £1 per head (which in the early stage of the concern Mr. Hawksley told the directors was the proper price to be paid) and afterwards by a reduction from 3s. to 2s. 3d. The amount had, therefore, been brought down by the sum of £6651. As to shares being given in lieu of debentures, the directors thought they were doing infinitely better for the company by the arrangement they had made, and he had no doubt if the concessionaires were offered debentures at par they would be exceedingly glad to take them. Mr. Lake complained that there was no deduction made in the case of Mr. Maw. The fact was, Mr. Maw's claim was £18,000, and the directors, by great labour and assiduity, reduced it to £1600.

Mr. LAKE: I did not say there was no deduction. I said "on the same terms."

The CHAIRMAN said the concessionaires would be very glad to do so, but the directors thought, and he still entertained the opinion, that they were adopting the better course for the company. It was difficult for him, a non-professional man, to speak here of Mr. Hawksley, who was a professional man; but he did not hesitate to say that a great deal of the difficulty of the company had arisen from Mr. Hawksley's recommendations to the board. The works which he had recommended had throughout, as he (the chairman) believed, been too large, and the directors would have done better if they had acted on their own judgment. In Denmark his works had been based upon too extravagant a footing, as they had been for this company. The directors had felt themselves bound to carry out his recommendations because of his great reputation, and all he (the chairman) regretted was that, at the commencement, instead of taking a great engineer like Mr. Hawksley, whose reputation was made, they had not secured the services of a less eminent man. Mr. Lake, no doubt, knew that at the bar it was very often a mistake to retain a great man, who never, perhaps, came into court, instead of a rising man whose reputation had to be gained. Had this company consulted a rising man, instead of an engineer like Mr. Hawksley, it would not have cost them so much, and they would have done better with him. With reference to the £2000 which Mr. Lake said Mr. Hawksley was willing to give up, he (the chairman) would give cogent reasons why the directors did not acquiesce in it. At that time Mr. Hawksley was arbitrator in Maw's case, and was likely to act so in Porter's case, and could charge what he liked in the conduct of those arbitrations; whereas, under the agreement by which the £2000 of shares were given to him, he was bound to do everything for the company gratuitously. It was thought, therefore, infinitely better to keep him bound by the shares till these matters were concluded, than to allow him to surrender them and charge what he liked to the company.

The SECRETARY, at Mr. Lake's request, read a letter received from Mr. Hawksley in April, 1866, in which the writer stated that he was desirous to transfer the shares, and that in doing so he was actuated by two considerations: first, he felt that the circumstances in which the company was placed rendered it necessary that all persons who had claims against it, except for contracts or work and labour done, should forego the whole or the larger part of their compensation. This would relieve the company of a great deal of dead weight, which, if not removed, would sink it. Secondly, because he wished to divest himself of all interest in the company before entering upon Maw's arbitration.

Mr. BULKLEY thought the explanation given by the chairman on this point must be satisfactory. Mr. Hawksley was at that time arbitrator in one case, and had another arbitration in prospect. The directors could not tell how long these would last, and he might have made very heavy charges which the company were not in a position to meet.

The CHAIRMAN said the only other question was as to the concessions and caution-money—whether any attempt had been made to get extension of time. Mr. Deekinge had been to every town, and seen the municipal authorities on the subject. In some cases money had been paid for a specific purpose, and with the exception of one or two towns, if the money could be found, they would be only too glad not only not to forfeit, but to replace the company's money. With reference to the directors remuneration, he was certainly much surprised at the observations of Mr. Lake, if it were true, as he believed it was, that that gentleman sent a letter dated the 6th of March, and signed 'Lake, Kendall, and Lake,' not to all the shareholders of the company, but to a certain portion of them. That letter dropped into the hands of a friend of his, and he might state that not one word would have been said in the report about the directors remuneration had it not been for the contents of this letter. It seemed to have been issued on the authority of Mr. Somerset Beaumont.

Mr. SOMERSET BEAUMONT: Mr. Lake has been acting for me throughout.

The CHAIRMAN said it seemed most extraordinary that an effort should be made against the whole of the present directors being paid for their services, when this circular letter actually proposed that the new directors should receive a minimum remuneration of one guinea each for every council attended by them.

Mr. LAKE: It states, however, that for the present no question of directors remuneration is raised.

The CHAIRMAN said when he found that part of the proposition to be made was that the new directors should receive a certain amount of remuneration, he did not see why the old board should not be paid for their services.

Mr. SOMERSET BEAUMONT said if the letter produced that impression he could set it right at once, because the whole object of the change was to get a body of directors who were large shareholders, and who would receive no remuneration at all for their services.

The CHAIRMAN replied that he could hardly take such an assertion in preference to a written statement. It seemed to him that this was a newborn zeal, which had only arisen since the report of the directors was published.

Mr. COLLIER: I do not understand Mr. Lake to say that the directors waived all claim to remuneration, but that they left it in abeyance until the funds of the company would permit its being paid.

Mr. LAKE: I understood that the directors entirely abandoned their remuneration, and not that they held the claim in abeyance till the shareholders received a dividend.

The CHAIRMAN: I remember what was said. It was said the directors had taken no remuneration. They could not have waived the claim, inasmuch as they put it in the accounts last time as a debt due from the company.

Mr. LAKE: Major Suart made a statement that it was on both sides.

Mr. BULKLEY: I much regret that Major Suart is not here. I saw him a few days ago, and he assured me most distinctly he had given no pledge of that kind. Certainly if I had been present at that meeting I should not have agreed to such a thing.

Mr. LAKE read a letter from Captain Beaumont in corroboration of his statement, and said he felt at the time that as the directors waived their claim to such extra amount as they had secured to themselves by the Deed of Association, it would not be necessary for him to go into the question of past management.

Mr. YOUNG did not think the letter of Captain Beaumont went so far as Mr. Lake's statement, and he remembered that when Captain Beaumont was a member of the board he proposed a resolution to the effect that the directors fees should remain in abeyance.

The CHAIRMAN said Captain Beaumont's resolution was "that the secretary be authorized to credit the directors with their fees for the past quarter, the same not to be taken till the company are in a position to pay them."

A DIRECTOR remarked that in Lake, Kendall, and Lake's circular letter it was said: "Nor is it in the nature of things to suppose that an unpaid board will take the same care of management unless they have a large stake in the concern." This seemed as though, in their opinion, payment was absolutely necessary to create an interest in the company.

Mr. SOMERSET BEAUMONT said the gentlemen who had consented to serve on the board stated that they wanted no remuneration—they merely acted as shareholders.

Mr. BULKLEY said, in reference to the remark made by Mr. Lake, that the concessionaries were quite willing to take debentures instead of shares. But it must be remembered that interest would have to be paid on debentures, where the shares bore no interest. That was the consideration the directors had in view.

Mr. RITA said if he had been present at the last meeting he should have put some questions with the view of ascertaining whether the £18,000 concession money had been properly paid to persons who knew anything about the country.

Mr. LAKE said the directors had acted *ultra vires* in the arrangement about the shares, and if the meeting adopted the report, the shareholders would be held to have given their assent to the proceedings. Under ordinary circumstances, the amendment would be for a committee of investigation.

Mr. SOMERSET BEAUMONT said what he proposed to do, as he could not agree to the adoption of the report, was to get the new directors appointed who would go through the balance-sheet carefully, and make a report to the shareholders as to their position and responsibilities. He was led to adopt this course because, though exception had been taken by the directors to Mr. Hawksley, he had not heard the authority of that gentleman challenged. On these matters, Mr. Hawksley had made him take a darker view of their affairs than the chairman seemed to take. His opinion seemed to be that they would only realize about 6s. 8d. in the pound. It was, therefore, due to the shareholders that this melancholy state of affairs should be investigated, and a report made thereon. He should advise the shareholders to go minutely into the matter, to see how these shares were disposed of, and what services were rendered for them, so that if there had been no consideration they might be struck off the register.

Mr. BULKLEY said he had not the slightest doubt the company did not get the consideration they ought; but this was a thing past and gone for the last two years, and, therefore, could not now be gone into.

After a considerable amount of discussion, the amendment was put, and negatived by a majority of one, and the original motion was carried, after a protest by Mr. Lake against the mode in which the question was submitted to the meeting.

A conversation ensued, upon a demand by Mr. Lake for a poll, which terminated by the solicitor of the company ruling that such demand was not signed by the number of shareholders which the Articles of Association declared to be necessary.

The election of directors was then proceeded with.

Mr. LAKE moved that Mr. Somerset Beaumont be elected a director, in the place of Major Snart; that Mr. Edmund Pontifex be elected in place of Mr. Collier, and Mr. T. H. G. Schacht in place of Mr. Dobson.

Mr. ZWINGLER seconded the nominations, which were put and agreed to.

Mr. LAKE moved, and Mr. RITA seconded, that Mr. Keyworth and Mr. Bulkley be re-elected directors, which was agreed to. Mr. Young was re-elected a director, upon the understanding that he would retire and make room for Mr. Rita on the board, the requisite notice for the nomination of the last-named gentleman not having been given in time for this meeting.

The retiring auditors, Messrs. Cash and Marshall, were re-elected, and their remuneration fixed at 15 guineas each.

This terminated the business of the ordinary meeting.

An extraordinary meeting was then held, for the purpose of considering certain proposed alterations in the Articles of Association—Mr. SOMERSET BEAUMONT in the chair.

Mr. LAKE moved a resolution to the effect that with a view to greater efficiency and economy in the management of the company, it is expedient the minimum number of directors be reduced to three, and the remuneration be diminished, and that the regulations of the company contained in the Articles of Association be altered, and new regulations substituted to the extent and in the particulars following:—In place of article 28, to substitute —"Such a sum (if any) of the annual net profits of the company as the council may from time to time determine may be set apart for the reserved fund." In place of clause C of the 38th article, to substitute—"A general meeting shall have power from time to time to increase or decrease the number of directors, so that they be not more than twelve nor less than three." In place of the 74th article to substitute—"Any general meeting, when notice in that behalf is given, may remove any director or auditor for misconduct, negligence, incapacity, or other cause deemed by the meeting sufficient, may supply any vacancy in the offices of director or auditor, may vary the number of directors, and, subject to the provisions of these presents, may generally decide on any affairs of or relating to the company." In place of article 103 to substitute—"The number of directors shall not be less than three nor more than twelve." To repeal the articles 110 to 114, and substitute in their places—"Every director shall receive such a remuneration as the company by a resolution of a general meeting may from time to time allow;" and to repeal the 158th of the Articles of Association.

Mr. RITA seconded the motion, which, after some discussion, was put, and carried.

Mr. DOBSON said he believed he expressed not his own feelings only, but the feelings of every member of the late board, when he stated that the company were greatly indebted to Mr. Milne, the secretary, for his services. Having himself been connected with a great many companies, he was free to confess that he never met with a more efficient secretary than Mr. Milne had proved himself, and he recommended him very strongly to the consideration of the new board. He was afraid the remuneration the company might be able to pay to Mr. Milne would be by no means equal to his merits; but if any arrangement could be made by which his services could be retained, he believed it would be infinitely to the advantage of the proprietors generally.

The proceedings then terminated.

METROPOLIS GAS SUPPLY.

CITY COURT OF SEWERS, GUILDHALL—TUESDAY, APRIL 16.

At the usual Fortnightly Meeting of the Commissioners, held this day —Deputy DE JERSEY in the chair,

Mr. BONTEMS, pursuant to notice, moved—"That this court do petition the Honourable the House of Commons in favour of the Metropolis Gas Bill in Parliament." He said he was happy to know that it required no persuasion from him to induce the court to sign a petition in favour of the bill. It was a source of great gratification to the Gas Committee of the corporation in all their arduous labours that they had had the unanimous support not only of the members of this court, but also of the members of the Court of Common Council. He wished he could say as much for the other local authorities of the metropolis, or even for the public at large, who had urged the corporation to take the steps they had done. He might be allowed to state, in reference to this question, that the crisis, at all events for the present year, was now very near, for he believed that immediately upon the re-assembling of Parliament it would be decided whether the Government bill would be passed or not. Of course the court were aware that very great exertions were being made by the gas companies to throw out this bill on the second reading. A committee of chairmen of gas companies had been sitting for some time, and communications had been had, not only with the companies interested in the supply of the metropolis, but with all the companies in every considerable town throughout the kingdom. Petitions had been obtained from these companies, and presented by the members representing the various towns, against the passing of the bill. No doubt the pressure which had thus been brought to bear had had a considerable effect upon the Government, but, so far as he was aware, the Government were still staunch and true upon the question. They, however, looked to the public, and as he thought they fairly had a right to look to them, to be supported against the combined attack not only of the gas interests, but of all joint-stock interests throughout the kingdom. The Gas Committee had done what they could to stem the tide and to support the Government. Amongst other things it occurred to them that it was the duty of the Commissioners of Sewers, as representing the ratepayers and consumers in the City, as well as because they had the management of the public lighting of the City, to petition Parliament in favour of the second reading. He had no doubt honourable members had seen the very strong article in the *Times* of the Saturday previous, in support of the gas companies. That article was founded entirely upon a fallacy. It assumed, in the first place, that the Metropolis Gas Act of 1860 was really a settlement agreed to by all parties, whereas it was no such thing; it was a settlement all on the side of the companies. And even had it been, as the writer assumed, a settlement of the question by mutual consent, another point assumed by the *Times* was equally fallacious, and that was, that a matter so agreed upon ought not to be reopened under any circumstances. Now he (Mr. Bontems) contended that if it were proved the Act of 1860 worked injuriously to the public at large, it was not an unfair or unreasonable thing, at the end of six years, to ask for its reconsideration. There had been a great deal said about the effect of the bill now before Parliament being to "confiscate" the property of the gas companies. Now no one, who had taken part in these discussions desired confiscation. He was sure the corporation did not desire the confiscation of the property of the gas companies, nor did the Gas Committee desire it; but he knew that they did desire one thing, and he thought they ought to desire it—viz., that a question which was supposed to have been settled in some way or other six years ago, and which settlement had worked so badly for the public, should at last have that reconsideration, at the hands of Parliament which it ought to have. It was upon this ground that he asked the court to support a petition to Parliament. He did not ask them to agree to all the clauses of the bill, because some of these clauses would require consideration in committee. The clauses of the bill were not inserted by the special Gas Committee of the corporation, nor by the Metropolitan Board of Works. He believed the gas companies themselves had more to do with suggesting to the Government some of the clauses than either of those bodies. For example, the 7 per cent. clause was not suggested by the Metropolitan Board, nor by the Gas Committee, and he did not know where the Government got it from. The Gas Committee and the Metropolitan Board joined in proposing to the Government that the companies should be limited to a fair maximum price, and that provision should be made for determining the illuminating power and purity of the gas, leaving the dividends to take care of themselves. If that had been done he thought it would have been better. At all events the Gas Committee were not responsible for these clauses of the bill, nor for other clauses to which objections might be taken. All they now asked was that the court would petition in favour of the second reading of the bill, the object of which was to amend the Metropolitan Gas Act of 1860, leaving the clauses to be considered by the select committee to which the bill would be referred. He therefore moved in the terms of his notice.

Mr. COX seconded the motion with very great pleasure. It should be recollected by the commission that this was not the bill of the corporation; it was a bill introduced by the Government, and, as Mr. Bontems had very rightly stated, the Government were responsible for it. No doubt there were many clauses in that bill which the corporation would not have introduced; but still they must look upon it as a whole, and the only way in which they could endeavour to get the bill taken into consideration was to support the second reading, leaving the committee of the House of Commons to deal with the clauses hereafter. He had no doubt much good would result from the agitation, which had now been carried on for some time. The gas companies had assured the commission over and over again that they had done all they could to meet the views and wishes of the public, whereas the reports of the gas analyst showed continually that the companies were extremely lax in many of their arrangements. The report of Dr. Letheby to be laid before the court that day showed a very remarkable contrast to anything he had ever before presented. As he understood it, that report was of a more favourable character, in reference to the purity of the gas than any previous report presented to the commission. This showed that when a little pressure was exerted there was a possibility of extracting something from the companies. He felt sure the court would be acting wisely in supporting the motion made by Mr. Bontems, and so endeavour to get the bill through its second reading, in order that its provisions might be considered in committee. The court did not desire to act on the principle of confiscation; they felt that the gas companies were entitled to a fair dividend upon the outlay of their capital. At the same time they felt that the companies having accepted the principle of monopoly and carried out the districting arrangements, which prevented consumers, if dissatisfied with one company, going to another, they were justified in seeking the protection which Parliament could give by the insertion of proper clauses in this bill, so as to prevent the companies from overcharging the public, or thrusting any quality of gas upon them that it might suit the purposes of the companies to supply.

Mr. DAVIS said he should not like the notion to go forth to the public that the commissioners were unanimous on this matter; and for this reason he begged to move the previous question. He had no doubt that in so doing he should find himself in a minority; at the same time he felt bound to protest against the proposal to petition Parliament in favour of the gas bill, inasmuch as he looked upon it as a measure of confiscation, and one that could never, now that public attention had been called to its iniquitous provisions, be allowed to pass the House of Commons. There was no likelihood, no chance of it so doing, and it would be a most unjust

Act if it did. At the present time there was a very large property at stake in gas-works, property belonging to persons in humble circumstances—widows and orphans and small investors—who were dependent for their income, and in many cases for their daily bread, upon the interest they obtained on these investments. The House of Commons was now asked to confiscate that property, which had been invested on the faith of the existing Acts of Parliament, and thus to bring ruin upon thousands of people. It did seem a very remarkable thing to him that the corporation of the City of London should put themselves forward to support a measure like this. And it was a very injudicious thing to his mind, because they were thus creating around themselves no end of enemies. One would have supposed they already had enemies enough; surely the present was not the right time to increase their number by a false step of this kind. And the conduct of the corporation was all the more remarkable to him that they were, in this matter, co-operating with the Metropolitan Board of Works in the prosecution of one of the most iniquitous measures ever presented to Parliament. He said it was remarkable, because this was the only instance in which the corporation (he would not say the City of London, for really the citizens took no interest in the matter) had ever co-operated with the Metropolitan Board—an instance in which they were about to do an act which would almost, if not entirely, destroy the property of a large number of people. He contended that this was not a right position for the corporation to take, and he believed there was hardly a private individual residing in the City who would care to put a few shillings in his pocket by doing an act such as they proposed to do. He (Mr. Davis) was one of the largest, if not the largest consumer of gas in the City, but he unhesitatingly asserted that he would scorn to take any step which should lead to the passing of this iniquitous bill, whatever advantage the proposed reduction in the price of gas would give him. He consoled himself with the belief, however, that the bill never would pass; it was quite impossible it should do so. The whole thing had been got up—he knew the history of it from beginning to end, and spoke advisedly—by a small knot of individuals, and it was only proper that this fact should be stated. He could understand the corporation when they complained that the City was supplied with bad gas—gas of an inferior quality—and he fully concurred with them when they proposed, if practicable, to make gas for themselves; but, having failed in that scheme, having found it wholly impracticable, for the corporation to co-operate with the Metropolitan Board of Works, of all people in the world, to commit a great iniquity upon the poor investors in gas companies, he considered was not a course which they ought to adopt. The corporation in this case were being made a cat's-paw of entirely by other bodies. (Interruption.) He maintained that the Metropolitan Board of Works were making a cat's-paw of the corporation to carry out their own purposes. They were being used to carry out an object which was in itself unwise and unjust, and could never receive the sympathy and support of the House of Commons. With these feelings on the subject, he begged to move the previous question.

The amendment was not seconded.

Deputy BONE supported the motion, and expressed surprise at hearing the remarks made by his friend and colleague. In some respects, however, he was not surprised at the manner in which Mr. Davis had treated the subject, for he was an extraordinary man, and as a rule, he was found opposed to the popular view of things. Mr. Davis seemed to have a notion of his own on every question, and was always desirous to carry that notion out. But when he talked about the public being able to take care of themselves, and of the oppression which the passing of this bill would be upon the gas companies, he (Deputy Bone) was really astonished, because Mr. Davis must know better. In truth, the consumers of gas had no power whatever at present to help themselves. If they did not like the gas they were supplied with, they had the privilege of burning candles or oil if they liked, but they had no power to go to another gas company. They had to deal with monopolists, and unless something were done the gas companies would continue to rule them with an iron rod. He had seen their conduct in that room, and he remembered that they had stated again and again that they could make no concessions. If they had been disposed to do so two or three years ago the present bill would never have been brought forward. There was one of the City companies which promised at starting never to exceed in charge 4s. per 1000, and they never did exceed it till the Act of 1860 gave them the power to do so. But no sooner was that Act passed than they took advantage of it. They said they did not do it themselves, the Act of Parliament did it for them; so they charged the citizens 4s. 6d., and gave them a worse article. That was exactly the position the whole of the consumers of gas in the metropolis were placed in. This commission had the chairmen of the several City companies before them at the time when they were doing all in their power to prevent the necessity for a bill of the sort now before Parliament, and what did they tell the court? They said they could make no reduction in the price at that time—they were then charging 4s. 6d.—and they gave no reason to induce the commission they ever would do so. Such being the case, and seeing that other companies in different places could supply a better article at a lower price, the commissioners, as custodians of the money of the ratepayers, would have failed in their duty had they not attempted to prevent the extraordinary increase which was taking place in the cost of lighting the public streets of the City. If his memory served him right, the price per lamp had increased from £2 15s. to £5 5s. per annum. Why should not the commission make some attempt to protect the ratepayers? If they had not done so they would have been unworthy of the seats they occupied, and under those circumstances he was surprised at the remarks which his friend Mr. Davis had made on this occasion. The commission and the public had no power under the existing law to help themselves. The companies had districted the metropolis, and in whatever district a consumer happened to live he was compelled to take the gas of the company supplying that district, or else go without gas altogether. If there were competition, as there ought to be, the public would have no right to complain, because, if they did not like the article supplied by one company, they could go to another; but they had no such power now, and, therefore, he hoped the commission would do all they could to see that the consumers paid only a fair and reasonable price for a proper article.

Mr. BONTEMS, in reply, said he supposed it was useless to hope to convert Mr. Davis, but he would remind that gentleman that there were other persons to be considered besides the shareholders in gas companies. With reference to the observations made by Mr. Davis, he might say that so far as his observation went, the shareholders in gas companies were not generally poor people, but wealthy people. There were far more poor people among the consumers of gas than among the shareholders in the companies, and he thought the commission should have some consideration for them. But he was surprised to hear Mr. Davis speak of something like underhand dealing on the part of the corporation in the exertions they had put forth on this question. If there was anything the corporation had ever done that was more plain and above board than another, it was the action they had taken with regard to the supply of gas. They had always courted publicity, and from the time they promoted their new bill and it was suggested by Parliament that they should take part in the investigation of the working of the Metropolis Gas Act, their operations had been all open and above board, and the public were invited to support them. He thought, therefore, it was wrong to talk about an undercurrent of influence being brought to bear against the companies. Then, as to the suggestion that they had plotted this agitation because they failed to obtain their own bill, he would only say that they were encouraged to go on by the course of circumstances. When the committee of the House of Commons decided that the principle of districting should be maintained, and that, therefore, they would not allow the corporation to have their bill to compete with the existing company, they gave them a report which showed that, in their opinion, the gas supply of London was not in the state it ought to be, and that further legislation must take place in reference to it. In fact, the corporation had only been doing what the committee of the House of Commons recommended them to do; and he thought that when the report of that committee was laid before the committee on the present bill, which it would be when the matter was referred to them, they would see in it a complete justification of all the steps the corporation had taken, and of the course adopted by the Government in bringing in the bill. He had no doubt honourable members had read the published report of a lecture recently delivered on gas, by one of the most eminent men of the present day, and had observed that he stated there was not a city or a town of any considerable size in the kingdom so badly supplied with gas as was the metropolis. Was that to be suffered to continue, because the selfish and private interests of a few private individuals were concerned in maintaining the existing state of things? Was that a reason why the greatest metropolis in the world should be deprived of a proper supply of the best artificial light that could be obtained, and which was so necessary for the purposes of trade and commerce? As to talking about investments made when gas shares happened to be at 50 or 60 per cent. premium, why, if these investments should turn out to be very bad—although he thought they could hardly be said to be very bad, if the shareholders got 7 per cent.—that was the fault of the trustees of the parties and those who had acted for them, and who had been imprudent enough to buy shares when at such a price in the market. It was no fault of the gas consumers, who were entitled to have the best gas supplied to them which could be procured under the circumstances.

The motion was then put and carried with one dissentient.

The REMEMBRANCER brought up and read the petition, which was signed by seven commissioners. It sets out by reciting, "That a bill is now pending in your honourable House, intituled 'A Bill to amend the Metropolis Gas Act of 1860, and to make further provisions for the supply of Gas to the Metropolis, and for other purposes connected therewith,'" and "that your petitioners have the management and control of the public lighting of the City of London." It then proceeds, "That the said bill is founded on the recommendations contained in the report of the select committee of your honourable House of last session to inquire into the operation and results of the Metropolis Gas Act, 1860. That your petitioners are of opinion that the principles on which the said bill is founded are correct, though some of the clauses contained therein may require alteration. Your petitioners, therefore, humbly pray your honourable House that the said bill may pass into law, and that such further and other provisions may be made, and clauses inserted therein for their protection, and that they may have such other relief in the premises as to your honourable House may seem meet."

THE MOVEMENT IN SUPPORT OF THE GOVERNMENT BILL.

A Meeting was held at the Westminster Palace Hotel, on Saturday last, April 27, in pursuance of the following circular issued by Mr. Bontems, the chairman of the City Gas Committee:—

Guildhall, London, April 24, 1867.

Dear Sir,—At my request, the Right Hon. Sir Stafford Northcote, M.P., has consented to meet such members of the corporation of London and of the vestries and local boards of the metropolis as may be desirous of urging upon Her Majesty's Government the necessity of pressing upon Parliament the amendment of the Metropolis Gas Act of 1860.

Those gentlemen who concur in this policy, and are willing to join in the effort, are requested to meet at the Westminster Palace Hotel, Victoria Street, Westminster, on Saturday next, the 27th inst., at eleven o'clock precisely, to proceed from thence to the office of the Board of Trade; and, should you intend to be present, a reply by return of post will oblige.

(Signed) JNO. F. BONTEMS.
Chairman of the Special Gas Committee.
of the Corporation of London.

P.S.—Your attendance will not pledge you to all the clauses of the Government Bill.

There were present on the occasion the Town-Clerk and Remembrancer of the City of London, and Messrs. J. F. Bontems, R. J. Chaplin, G. Bone, W. C. Fowler, J. Paterson, E. D. Rogers, A. Pitt, R. Cox, C. Grimwade, F. Cox, J. Medwin, J. Jervy, R. Pallett, J. Land, E. Tyler, J. Callow, H. Agar, W. S. Yarrows, E. G. Dunnell, J. Jewell, G. A. Nicholay, G. Todd, T. H. Hartley, A. Smith, J. H. Elt, W. Lyon, E. Rendle, G. Hunt, R P. Davies, A. Robinson, J. Hutchinson, J. Lawrence, J. Burdon, C. Jacob, W. H. Surrage, T. Eldridge, J. Beal, R. D. Hilton, J. Dowden, G. W. Barnard, G. L. Turney, H. S. Armstrong, C. Pigent, J. Fuller, T. B. Brown, — Akerman, — Crompton, — Howell, H. Barton, H. Porter, E. Dollemore, and F. H. Fowler.

Mr. BONTEMS, on taking the chair, said: As I was the convener of this meeting, it may, perhaps, be expected that I should say a few words as to its object; we shall then proceed at once to decide upon the best means of carrying out that object. It is not desirable, I think, in our interview to-day with Sir Stafford Northcote, that we should refer to the details of the gas question, or to any particular opinions we may entertain upon the way in which that question might be best settled. I think the foundation of our proceedings to-day should be the report of the parliamentary committee of last year, which was obtained at great trouble and expense at the instance of Parliament itself, Parliament giving a pledge at the same time that if, after inquiry, it was found that the Act of 1860 had not worked well for the public, then that fresh legislation should take place. I know there are different opinions as to different clauses of the bill now before Parliament, but it will be time enough after the second reading to consider those opinions, and to decide what alterations should be asked for. I was rather amused by the facetious expressions, with regard to the bill, made use of by Mr. Richards, the governor of the Imperial Gas Company, at their meeting the other day. He spoke of it as having been "got by Special Pleader out of Analytical Chemist." Whatever may have been the pedigree of the bill, I believe it is

one that has a good constitution. It may want a little training, but with that training it will be a great success; at all events, I think it will be the popular favourite. As I said before, it is not desirable we should to-day enter into the details of the bill, but it is necessary, and that is the object of this meeting, that we should support the Government against the attacks of the joint-stock interest. We have not only to contend against the gas companies of the metropolis, but against the united joint-stock interest—the gas, water, and railway companies of the three kingdoms. It is, therefore, not surprising that the Government should feel that they need support from the persons interested in the question—the inhabitants of the metropolis. I think we cannot give them better support than by the assurance of those gentlemen who are elected in the various parishes to represent them. Through them, I hope, we shall tell the Government to-day that whatever may be the result of the bill, it is our determination not to cease the agitation until we have the gas supply of London put upon a proper footing. The City of London, the first city in the world, is so situated with regard to the supply of coals, both by water and railway accommodation, that it is entitled, apart from its great wealth, to have the best supply of gas of any place in the three kingdoms, instead of the worst. I have sent an invitation to all the metropolitan Members of Parliament to meet us to-day at the Board of Trade, at twelve o'clock. The only answers I have received are from Mr. Crawford, one of the members for the City, and Alderman Lusk, one of the members for Finsbury. It may be that other members will meet us at the Board of Trade, but on account of the Easter holidays some members may be out of town, and therefore will find it impossible to be with us to-day. But I hope, if there is any flinching on their part in supporting the public on this question, we shall let them hear of it when the time comes that they want our assistance at the elections. I shall not detain you longer, as I am desirous of arranging the details, seeing that we shall not be able to trespass long upon the attention of the Government to-day. Of course, it is desirable to take a gentleman from each locality of the metropolis, so that all may be represented; and, with the assistance of some friends, I have sketched out a list—not that I wish to dictate to the meeting—of who shall be the speakers, and I know that you will recognize in these names the names of gentlemen who are leaders in their districts. If you wish to make any additions or alterations, you will have a perfect right to do so. I suggest that, as I have been in communication with the Government, I should first say a few words on the subject, and should be followed by Mr. Nicholay, from Marylebone; Mr. Elt, from Islington; Mr. Beal, from Westminster; Mr. Collinson, from Southwark; Mr. Fowler, from Lambeth; Mr. Turner, from the Tower Hamlets; and Mr. Dresser Rogers, who has all along taken a deep interest in this question. I think, if you do not wish to add any more names, we had better at once proceed to the Board of Trade.

Deputation to the Board of Trade Office.

Saturday, April 27.

(*Present*:—*Sir* Stafford Northcote, *Mr.* Farrer, *and Mr.* Wyatt, *Parliamentary Agent.*)

The deputation, consisting of the above-named gentlemen, was accompanied by Mr. Crawford, M.P., Captain Grosvenor, M.P., and Alderman Lusk, M.P.

Mr. Crawford: The gentlemen who attend here to-day, sir, represent the consumers of gas in the metropolis, and their object in waiting on you is that, as you have charge of the gas bill introduced by the Government to carry out the recommendations of the select committee of last session, they are desirous of having a conference with you on that subject. There are gentlemen here who know more about it than I do, and they will, with your permission, explain what the views of the consumers of gas generally are in respect to the proposed legislation. I have, at great inconvenience to myself, come here to-day to show my interest in the question, and I hope, if I have to retire before the close of the interview, you will not think me wanting in respect to yourself, or as showing any lack of interest in the subject.

Mr. Bontems: Perhaps, sir, I may be allowed to say that, in order to save your time, we have selected one gentleman from each of the metropolitan constituencies, who will make a very few remarks on the subject. These gentlemen are all leading men in their different localities. Some of them are members of the Board of Works, some belong to the vestries, and some are members of the corporation of London; and the whole of the gentlemen present are representatives of various district boards. Sir, it has been said, both in Parliament and out of it, that this agitation for an alteration in the Gas Act is conducted by a clique of agitators who do not possess the sympathy of the public. This interview is sought for the purpose of convincing you that such is not the case. All the gentlemen present are engaged, more or less, in important businesses, and Saturday is one of the worst days that they could possibly be called to leave them. Their presence is an indication of the deep interest they feel as representative men in the question. I do not intend to trouble you with any details of the gas question; they have been fully gone into on previous occasions. We take the report of the committee of inquiry last session as the foundation of our demands. The Government have been kind enough to act on that report, and to initiate a bill to carry out those recommendations. It is to support the Government in that action that we are here to-day. We are here also to urge upon the Government the importance of not giving way to the pressure that is being brought to bear upon them by the joint-stock interest of the kingdom. We think the interference of directors and shareholders of gas companies in all parts of Great Britain—an interference called forth by the directors of the London gas companies—is most unjustifiable. The gas supply of the metropolis cannot be understood by those petitioners. In many towns I know personally the gas consumers are getting a much better gas than we are, at a much lower price, while the proprietors of gas shares are not getting anything like so large a dividend as the London gas companies are receiving. The circumstances of the case, in fact, are entirely different, and therefore I hope that the representatives of those places in the House of Commons will not be led away by the letters and petitions of the gas proprietors, but will likewise consider the interests of the gas consumers of their respective localities, which are identically the same as those of the metropolis. We are also here to urge upon the Government the importance of proceeding with this question this session if possible, and of bringing it to a settlement. You, sir, are quite aware that a great deal of time and money has been expended over this matter. We have the result of the inquiry of last session in the report of the select committee, which is not generally supposed to be favourable to the interests of the gas consumers. The directors and shareholders of the gas companies say that they allowed judgment to go by default, and that they did not produce the evidence they might have done. We say that that was not our fault; we gave our money and time to the inquiry, and the consumers of London ought to have the benefit. At least, we ought to have it conceded to us that the bill of the Government should pass its second reading, and then if the gas shareholders and directors think they have been ill-used by the committee of last session, that they ought to be able to make up their own deficiency by supplying evidence this year. We say, by all means let them do it. We are prepared to meet them again with the same evidence we produced last year, and to multiply that evidence if it is found necessary. As to the fallacies of the press—the *Times*, and *Punch*, and the *Saturday Review*—I think I need not refer to them. We know how powerful the gas interest is, and know how able it is to get possession of those papers to support its monopoly; but with regard to the *Times*, and with regard to the members of the House of Commons who oppose this bill, I would remind them that they are supplied with better gas than the City of London and the inhabitants of the metropolis generally are supplied. The House of Commons is lighted with cannel gas of a much more powerful description than we get in the City, and the editor of the *Times*, not satisfied with common gas, is actually obliged, to save his eyes, to get a supply of superior cannel gas from another company. Therefore I say it is fallacious on the part of the *Times* and other prints to say there is no case on the part of the gas consumers of London. And, sir, I need not tell you how fallacious it is to say that, because there was some arrangement made in 1860—which I deny to have been any mutual arrangement, but even if it had been, if it were found to work badly for the public, it ought not now to be looked into, and, if possible, revised; and surely our representatives in Parliament are the persons who should investigate the circumstances, and if a reform be necessary, to grant it. We have abundant evidence unconnected with the gas consumers—scientific evidence, multiplied day by day and week by week—as to the state of the supply of London. I dare say the Government have noticed the important lectures recently delivered by Dr. Frankland before the Royal Institution, in which he cries "shame" upon the gas supply of London, and says it is a disgrace to the chief city of the world that it should be so supplied. As to the faith of the gas companies themselves in their own system, we have a remarkable proof that there is a great want of confidence among the shareholders in the dear companies as to the security of their interest, as compared with the faith which the shareholders in the low-priced companies have in the security of their interests. It is a fact that at this time the shares of the South Metropolitan and Independent Companies, who are selling gas at 3s. 4d. per 1000 feet, are at a considerably higher premium than the shares of any other companies in the metropolis. I will not trespass any further upon your time, sir, than to say this: What we claim is to have this monopoly well regulated, and the only pretence upon which a monopoly can be sustained—a monopoly, I mean, in the supply of gas—is that it should be a well-regulated monopoly. We say this report of the committee of last session proves most positively that the gas supply of London is not a well-regulated monopoly at present, and we say Parliament ought to regulate it properly, or else allow us to return to that competition which we enjoyed before the competition was established. Then we should be able to help ourselves. I say it is very hard that in the City of London we should have to pay 4s. for bad gas, which is really 12-candle gas, though it is made to appear as 14, when the corporation have offered for 3s., and certainly for 3s. 6d., to give the public 18-candle gas. On all these grounds we do say it is desirable that the Government should be strengthened, and that our case should be put forcibly before the House of Commons. As representing the inhabitants of London, we are thankful to the Government for taking up this question. We do hope they will stick to it, and we can assure them that in so doing they will confer a great benefit upon the public.

Mr. Nicholay: As a member of the Metropolitan Board of Works, I have thought it my duty to attend here to impress upon the Government the importance of this question, and to assure them the time has come when the public expect action to take place. For many years the parish of Marylebone has fought this question, and, as Mr. Bontems has told you, we are now parcelled out, and have no chance of helping ourselves, although we are not supplied with the article for which we pay. I am a large consumer myself, and am supplied by the Chartered Company at Westminster, with what is called cannel gas; but it is not cannel gas at all. Our officer of health, who constantly tests the gas, told me a little incident which is worth mentioning. He told me that the complaints are so frequent, that he is obliged constantly to be testing the gas, and he said, "I invariably find that when the House of Commons is sitting we are supplied with a much better article than at other times." Now, sir, Dr. Whitmore is my authority, and he will, on oath, prove that fact to the satisfaction of the Government. I think it is a very unfair and hard case that, in order that we should be supplied with a pure article, we should have to call upon the Legislature to be always sitting. I suppose our Members of Parliament require holidays as well as other people, but we do think it is really a case of hardship that when they are not sitting we are not to have the article for which we stipulate and for which we pay. I need not, sir, call your attention to the fact that gas is now one of the necessaries of life. The fiat has gone forth from your Government to enfranchise the masses. I call upon the Government to enlighten the masses in order that they may have warmth and light at a fair and reasonable price. The large consumers of gas may put up with a higher price for gas, but the artisan in his room and the seamstress at her work are compelled to use a bad light, because they cannot procure a supply of gas at a moderate price. I believe it would amply repay the companies to give such a supply, because it would lead to a very largely increased consumption. The occupier of every room in the abodes of the working classes, instead of having to light a fire, would at once use gas, if it were placed within his reach. Sir, you are so thoroughly acquainted with the subject that I must not take up your time any longer; but I would simply call your attention to this fact: The city and the various parishes have in little matters had little antagonisms, but on this great question we are thoroughly united. We are like the bundle of sticks—singly, you can mould us or do what you please with us; but unitedly, you will find, if the Government do not do their duty in this matter, we shall take the question up for ourselves. With regard to the metropolitan members, great praise is due to those who are here this morning; as to the others, we know that it is the recess, and that they have been very hard worked of late, so that we ought not to be hard upon them because of their absence. But when we have the opportunity of meeting them we shall call upon them to back up the Government in doing what is right and just. We shall certainly put the pressure upon the metropolitan members, and if they do not assist you they will hear of it when the time comes.

Mr. Elt: I have been requested to offer two or three observations on behalf of a large portion of the borough of Finsbury which I represent—Islington; and I think I may safely say on behalf of the consumers of that parish that they are almost unanimously anxious for a new settlement of this question. It was supposed that the Act of 1860 was to be a settlement, but that Act has been found so workable and unworkable that we are much

discontented with it. It has been found exceedingly workable on behalf of the gas companies, and very conducive to their interests, seeing that since 1860 the dividends paid upon their shares have increased 25 and in some instances 30 per cent. But it has been found extremely difficult for the parishes and district boards to work this Act for the benefit of the consumers. What we in Islington and Finsbury are anxious for is that we should have pure gas of good illuminating power at as low a price as we can get it, having reference to the interests of those who produce it. We do not want anything unreasonable. If we have purer and better gas, and the companies cannot produce it at a lower price, be it so; but if they can give us better gas at a lower price, I think we are entitled to it. If at Manchester, or at Plymouth—which is quite away from the coal-fields—they can produce better gas in every respect at 2s. 9d per 1000, why cannot it be done in this great metropolis, and why are we obliged to pay 4s. for a very indifferent article? I know something of Plymouth, and I can assure you the supply of gas there is within a small area, which cannot at all be compared with the supply of gas to London. Of course that is a very great element in the consideration of the question of the price at which gas can be supplied. We know that from the nature of things the manufacture of gas must be a monopoly, but we want it to be a well-regulated monopoly, for the benefit of the consumers, and also for the reasonable benefit of the shareholders and those who have invested their money in the manufacture of this article. I would venture to offer one suggestion to you, sir, and to urge upon the Government that there should be a clause inserted in the bill which is not there at present, and that is with respect to the places where gas shall be manufactured. We all know that the manufacture of gas must be of a very deleterious and dangerous character. I believe that so deleterious and dangerous a manufacture should not be carried on in the midst of a dense population like there is in London.

Sir STAFFORD NORTHCOTE: I am afraid that question is not within the terms of the notices, and therefore we need not discuss it.

Mr. ELT: It is a very important matter indeed.

Sir STAFFORD NORTHCOTE: We had better not go into it now.

Mr. ELT: The companies should be required to remove their manufactories within a reasonable time.

Sir STAFFORD NORTHCOTE: It cannot be done by this bill.

Mr. BEAL: I only desire to assure you, sir, of the public sympathy with the Government in this matter. Since November last we have not taken any active steps, for you then undertook the responsibility of it, and we thought it desirable to leave the Government unfettered. We felt that you had taken up the position of arbitrators, and we were desirous not to paralyze your action by any interference on our part. But now that the system of bullying has been adopted by the gas companies, it is essential that the public should again take up the question, and assure the Government of their desire that it should now be settled on the terms of the bill you have introduced. Your position, sir, is a very peculiar one, each gentleman who has a petition to present calling upon you to give up the bill. But we must ask you to believe that against the organized action which is brought to bear upon the House of Commons in this matter we have no defence, except in the firmness of the Government. We think the Government should state distinctly that this is a case which in their opinion should be submitted to the House of Commons, and that the whole force of the Government should be brought to see justice done in the matter. We have felt considerable difficulty in dealing with the question, because on the part of the consumers the demands would be extreme, if we presented them as they are brought before us; but having perfect faith in the judicial aspect which you take of the question, and having given our adhesion to your views, we feel that you require some help from outside. It is because of this that we are here to-day. We have had public meetings in the metropolis, and have done all we could to back up the arguments in support of the bill. I see that the companies are now urging upon you the policy of delay. It was that policy which was fatal to us in the year 1860; we were compelled by this policy, which they forced upon us, to give way, and to do the best we could. They ask you now to withdraw the bill, and reintroduce it with blanks instead of figures. I think you will be justified in saying, you will go into committee with this bill, treating the figures as though they were blanks; but to adopt the recommendation of withdrawing the bill and reintroducing it would be ruinous to the prospect of success. I will undertake to say that if you agree to that suggestion you might as well give up the bill altogether. What you have to do in the interests of the public is to put your foot firmly down and to say, this is a great public controversy on a question which the Government have taken up, and the Government wish it to go to a committee. We may be unfortunate in carrying out our views before a committee, or if we succeed we may afterwards have the bill recommitted by the House; but that is what we desire should be the course adopted, and it is to support you in this policy that we are here to day. If needful we are quite prepared to come out either in public meetings or by petitions, so as to convince you that the Government have the sympathy of the consumers.

Mr. COLLINSON: If there were any desire on the part of those who are engaged in this movement to confiscate the property of the gas companies, you would not see me nor many other gentlemen who are present here to-day. It is because we have a grievance, and, as we believe, a real grievance. We have had it since 1860; we had it before. We have had great pretensions as to what should be done for us, but they have all failed, and we are as bad off now in reference to the quality of the gas supplied, and worse off with reference to price, than we were before 1860. I think the course taken by the gas companies in reference to the present bill will induce many more persons to move in the matter. They are sending circulars and pamphlets and copies of the bill throughout the country. I myself have received, from a shareholder in a small country gas-works, a pamphlet most jesuitically written, urging the shareholders of country gas companies to immediate action against the bill now in Parliament, which they say is to confiscate their property. We do not desire anything of the kind. We have no desire to hurt them; all we want is good gas at a fair and reasonable price. It is not too much to ask that if Manchester obtains 22 candle gas at 3s., we should get 18-candle gas 3s. 6d. It is too bad that with the enormous consumption of gas in London, we should be supplied, as we are, with an inferior article at a higher price. I can assure you, sir, the public at large look to the Government to protect them You have introduced several good and practical measures into Parliament, and we hope you will stand by this gas bill as Mr. Hardy did by his Poor Law Bill. In doing so I am sure you will have the approbation of the public.

Mr. FOWLER: I represent a large district on the south side of the Thames, and I may inform you that we have had a committee sitting upon this very important question for the last two years. We also were engaged in the movement originally, and the fear we now have is, lest the action of the gas companies in 1860 should be repeated, and we should suffer the same defeat that we did then. In Lambeth the company which supply the upper part of the district—the South Metropolian Company—are selling gas at 3s. 4d., and that too in what I may call a sparsely inhabited locality; whereas, in the denser parts of Lambeth—those portions where the greatest amount of gas is consumed—the price is much higher, and the quality inferior. That does seem to us an anomaly hardly to be accounted for. If a company which have but a moderate consumption can afford to reduce the price, it is hard to understand why the large companies cannot do the same. The complaints are constant that we get very bad gas, very defective in illuminating power. The medical officer's attention has been repeatedly called to it, and though he continually reports that the gas is of good illuminating power, yet, as every tradesman still complains, we are convinced that the present tests are altogether fallacious, as provided by the Act of 1860. All we hope is that the Government will not consent to have the same farce enacted over again that was enacted in 1860, whereby a compromise was made which was all in favour of the gas companies alone.

Mr. TURNER: I represent a large district of the Tower Hamlets, and, as you are aware, most of the inhabitants are composed of struggling tradesmen. They think the present price of gas is a very great grievance under which they have to suffer. We have been struggling on for nearly two years with an assurance of a redress of the evil, and we have held public meetings to organize some plan to remedy the complaints. I assure you, sir, that we have been looking with great expectation, and with thankfulness to the Government in the steps they have taken in the matter. At the present moment some hundreds, I may say thousands, of the consumers of gas in the Tower Hamlets are looking with extreme anxiety to the fate of the Government bill. We are heavily taxed in other respects, and in many of our parishes we believe that £15,000 or £20,000 a year are wasted which might be saved to us. We, therefore, humbly hope that the Government will press forward their measure in the interests of the gas companies.

Mr. DRESSER ROGERS: I have, sir, only to say that during the last few days I have been obtaining from the several districts of the metropolis the cost of lighting the public lamps on the first introduction of gas; the cost in 1853, when the competition existed, and the cost at the present time. When those returns are completed I shall lay them before you. I believe the fact is that at the present time, all over London, the cost is considerably in excess of what it was in 1823 or 1827, when gas was first introduced, and also considerably more than it was in 1853, although the companies have now a monopoly, the consumption of gas has largely increased, and considerable improvements have been made in the process of manufacture. The companies have petitioned Parliament, and tried to influence members to vote against the Government bill. I am justified, however, in telling you that many thousand signatures have already been obtained to petitions in favour of the bill, and that by the time Parliament meets many more signatures will be obtained in favour of it, and I submit that these petitions are as much entitled to consideration as those of the gas companies.

Sir STAFFORD NORTHCOTE: Gentlemen, my time, I am very sorry to say, is short; but perhaps I need not say much in answer to what you have stated. You know, generally, what is the position the Government have taken up. We had no interest in the matter ourselves; but when it was brought before us, in the first instance, by a deputation from the vestries and others interested in the consumption of gas, we looked into the question and we found it had been left in a position which appeared to us to be a very unsatisfactory one. The report of the committee, last session, seemed to render it necessary that some further steps should be taken, and it did appear probable that we might save time and expense, and might be able to conciliate all parties if we undertook the office of arbitration. It is, perhaps, never a very discreet step to take, to come forward as arbitrators, and perhaps we were a little too sanguine at first. However, we did hope that by communicating with the consumers and the Metropolitan Board on the one hand, and the gas companies on the other, we might come to some arrangement which would be acceptable to all. Nevertheless, as matters went on, we found this was not to be done, and we found moreover that when we appealed to the statements made before the committee, the gas companies told us their case was not fully heard before the committee. That being so, we felt that it was quite impossible for us to undertake either to complete the work of the committee or to revise the work of the committee, or in any way to take upon ourselves the suggesting of the terms which should be finally settled. We considered, therefore, that there was no other course open than that the matter should go before a select committee of the House of Commons, where the evidence which we were told had not been produced might be produced. We certainly, I am sorry to say, lost a great deal of time in consequence of the endeavours to bring the matter to a settlement out of doors. If we had known at first that we could not do that, we should have introduced the bill at an earlier period. We lost time by those attempts, but our anxiety has been in every possible way to meet the objections raised, and to try if we could consistently with what appeared to be just and proper, put the bill on such a footing as to reduce the questions at issue to the smallest possible number. We found the gas companies were not disposed to accept our terms. We therefore brought in a bill which, from the first, we said was merely a measure for the committee to discuss, and that we did not bind ourselves to any of its particular provisions; we did not mean the details which we found it necessary to insert to be binding, if it could be shown that it was possible to upset the evidence upon which they were founded. However, the opposition took the form described—a great many petitions have been presented against the bill. I made an offer some time ago to the companies, that if they would allow the bill to go before a committee without dividing the House on the second reading, at which stage it is impossible to discuss the details, I would consent to withdraw this bill, and introduce another in blank. If that had been accepted at the time, it might have been carried out before now, and we should have found ourselves in the same position we are in at present, only with the second reading admitted, so that the bill could have been submitted to a select committee. However, that was refused, and the matter now stands over till next Monday. On Monday next we go again with the bill for a second reading, and we are threatened with renewed opposition. Well, since the recess began, we have made further propositions to the companies. We have proposed to them that we would undertake, not to withdraw the bill, but we proposed, if they would consent to its being read a second time without opposition, we would propose certain amendments in committee, which we could put on the paper as amendments by the promoters of the bill. By those amendments we expected to meet all that was reasonable in their demands. I am sorry to say we have received another letter from the gas companies to-day, which declines to accept this proposition. Well, then, our position is simply this—we have introduced a measure, for the details of which we do not attempt to argue, but which we merely say is a fair measure to go before a committee. We do not wish to put ourselves in the position of advocates on either side, but we think it right and proper that the measure should be considered by a committee, provided there is time for it, and that we can see our way to get a specific settlement. I do think it is extremely desirable, if possible, to get a settlement in the present session, for reasons that are obvious to us all; but I think it would be very undesirable

that it should be a mere patched up settlement, not founded upon any principles which are true and satisfactory. We have a very difficult question to deal with. We are dealing with a regulated monopoly. In England we are not much accustomed to monopolies, nor are we clever at regulating them. The companies say we ought not to tamper with the faith of Parliament, and the clear security upon which their capital was raised. That is very true; but, on the other hand, it must be remembered that the condition upon which that capital was raised, was the condition of an open competition. Since the capital was raised, and the companies have been at work, an entire change has been made by the introduction of a system of regulated monopoly. If the companies wish to go back to the old system, they have merely to get a repeal of the Act of 1860; and to that, probably, the consumers would offer no objection. But if we are to deal with the question of a regulated monopoly, we must see whether the regulations which were enacted in 1860 have worked fairly or not. That, as it seems to me, is a matter which Parliament ought to consider; aud, as far as we can do so, it is our intention to bring that matter simply and fairly before Parliament, and to give a select committee an opportunity of properly going through the whole question, and settling it upon a fair basis. The principle upon which the propositions are founded is simply this—that we should endeavour to make the penalties for not complying with the terms which Parliament prescribes real penalties, instead of merely sham penalties; and it appears to us that we can only make them so by making them in some way fall upon the dividends of the companies. Well, gentlemen, the bill will come on for its second reading on Monday, and it will be for the House of Commons to decide whether it shall proceed or not. I hope that in the result we shall arrive at a satisfactory settlement of this much vexed question, which we have earnestly endeavoured to bring about, and in relation to which the Government have acted throughout, not in the spirit of advocates, but of arbitrators.

Captain GROSVENOR observed that his determination was to vote for the second reading of the bill.

Alderman LUSK thanked Sir Stafford Northcote for the kindness and courtesy with which he had listened to the statements of the deputation.

The deputation then retired.

CLERKENWELL VESTRY, THURSDAY, APRIL 18.

At a Meeting of the Vestry of Clerkenwell, held this day, a letter was read from Mr. Bontems, chairman of the Gas Committee of the Common Council, asking the vestry to support the Government bill, and also a letter from the vestry of St. James's, Westminster, enclosing a draft form of petition suggesting the insertion of clauses to provide for compulsory average meter consumption in public lamps, &c.

Mr. BEST very strongly opposed any action being taken by the vestry in support of the bill, which he denounced as one of spoliation. He said he had no interest in any gas company; but he considered it would be a very dangerous precedent to establish, if the Legislature were to interfere with the rate of dividends already settled by Acts of Parliament on capital invested in public companies. He therefore moved that no petition be sent.

Mr. HOPKINS seconded the motion, and expressed his strong opposition to the course which had been pursued by the Metropolitan Board and the corporation on this subject.

Mr. THOMPSON, the representative at the Metropolitan Board, defended that board, and stated that it was not their wish to injure the property of the gas companies, but simply to put them under such restraints that the gas consumers would not have any just cause to complain of them.

Mr. C. B. HOLLIDAY stated that in his opinion the bill, if passed, would introduce a system of confiscation which would not end there. He did not consider 10 per cent. too high a dividend on property subject to such risks as gas propety is subject to, and he should support the motion.

After a lengthened discussion, in which Mr. E. D. JOHNSON and several other members took part, it was resolved, on the motion of Mr. CROUCHER, to proceed to the next business.

A LITTLE LIGHT UPON THE GAS REFORM BILL.

[From *Punch*.]

The brilliancy of *Mr. Punch's* wit is of quite sufficient radiance to illuminate his office, and *Mr. Punch* is, therefore, forced to burn but little gas. Still, in the interest of his readers, that is, the nation generally, he desires to see the best gas supplied at the least price that can possibly be charged for it. As gas does not grow wild, some people have to make it, and these persons have an inclination to be paid for it. If a scheme could be devised for growing sunbeams out of cucumbers, gas might be dispensed with, and bottled sunshine take its place. But unluckily at present bottled sunshine is all moonshine, and of all invented substitutes the cheapest light is gas.

Being, therefore, well-nigh a necessity of life, it is not very wonderful that gas should now and then be talked about by people who say they cannot get it—at least of a good quality, and at a fair price. Their talk having at length come both to the ears and the *hear! hear!s* of the House, the present Government, although Conservative, has introduced what, in one sense, may be called a liberal measure, to reduce the price and regulate the quality of gas. One may call the measure liberal, for it would liberally distribute all the gain in making gas among those who consume it, an arrangement which the latter would doubtless find convenient. Unhappily the bill has little chance of being passed, because in England there are still old-fangled notions about honesty, and Parliament is not yet quite prepared to legalize sheer theft. This may sound an ugly word, but it may be made use of on the faith of the *Times* newspaper, a journal which is not accustomed to misstate matters, and which regards the gas bill as being without precedent, in this country at all events, as "an Act of confiscation." The bill proposes to upset two previous Acts of Parliament, on the faith of which large sums have been invested in gas companies, which will virtually be ruined if the measure becomes law. Listen, Sir Stafford Northcote, to what the *Times* says of your child:—

"No doubt, it is very desirable that London should have good gas, and that it should have it as cheap as it can profitably be made; but it is not desirable, because it is grosaly unjust, that these ends should be obtained at the sacrifice of pledged faith and the rights of individuals. There is no way to obtain a commodity so cheaply as steal it, and this is what the bill of the Metropolitan Board proposes to do with the gas."

John Bull wishes for cheap gas, but hardly, one would think, at such a dirty price as this. Of course, if Parliament breaks faith with gas-makers, it may with railway shareholders, or investors in the funds.

Without alleging that the companies have failed in fulfilling their contract with the public, the gas bill coolly cuts down the dividends allowed them, and thus virtually repudiates the contract with the companies which Parliament has made. People who petition in favour of the measure might with equal justice petition for an Act to reduce the Three per Cents., or to confiscate the *Times*, or *Punch*, or any other private property, with the simple view of pocketing the money thereby gained. Anybody who has sixpence, or any larger sum, invested in the funds, or in any English railway or other trading company, will find his property depreciated if Parliament once pass an Act of confiscation, such as that which now the Board of Works is smuggling through the House. *Mr. Punch*, then, as perhaps the richest commoner in England, with all his heart "says ditto" to this protest of the *Times*:—

"We must protest against the first instance in our legislation of a deliberate proposal to confiscate private property without compensation for the supposed benefit of the public. It must be remembered that property is none the less private because it is absorbed in a vast company, and that public faith is none the less sacred because it is pledged to an impersonal corporation. The former consideration does, indeed, suggest a peculiar point of cruelty which would be inflicted by any such measure as the present. A company may seem a scarcely sentient body, but it is composed of individuals who have often staked their fortunes and the happiness of themselves and their families on the security of their investments. Where they have done this on an open risk, they must be prepared to take all consequences; but where they have only made a prudent investment on what seemed almost a parliamentary title, it would be a cruel and unpardonable injustice if Parliament were itself to confiscate their property. Moreover nothing will be gained in the end by violating any such public pledge. No Metropolitan Board will ever supersede the necessity of joint-stock enterprise, and joint-stock enterprise will receive a fatal blow in the day when the public, for selfish interests, violate legislative engagements into which they have deliberately entered."

Hearing this, Sir Stafford, you surely will be wise if you reform your gas reform bill before you ask the House to pass it. All the railway men and fundholders of course will vote against it, for, if the measure passes, their turn may come next. English capital will fly abroad for safe investments, if faith in English Acts of Parliament be lost. Depend on it, Sir Stafford, the subject of your gas bill requires further light on it before you ask your colleagues to flare up in its defence. If gas reform be needed, prepare an honest measure, and *Mr. Punch* will pass it for you with abundant pleasure; but he will not lend his aid to any "Act of confiscation," though all the vestrymen of Bumbleland were to bray and bellow at him for refusing them his help.

A COURSE OF LECTURES ON COAL GAS.

BY DR. FRANKLAND, F.R.S., &c., &c.

[*Delivered at the Royal Institution of Great Britain.*]

FIFTH LECTURE.—THURSDAY, MARCH 21.

Crude coal gas contains, as we have seen, three distinct classes of constituents, which may be conveniently arranged under the heads of—1. Impurities; 2. Diluents; and 3. Illuminants. On the last occasion we considered the properties of two of the impurities—viz., sulphuretted hydrogen and bisulphide of carbon. We have still two impurities to notice—viz., carbonic acid and ammonia. Carbonic acid is always generated in the process of manufacturing coal gas, because coals of all descriptions contain oxygen. Part of this oxygen unites with the hydrogen present in the coal with the production of water; the remainder combines with carbon, and in so doing generates two distinct products, one belonging to the impurities—viz. carbonic acid, and one belonging to the diluents—viz., carbonic oxide. The former contains the largest amount of oxygen that ever combines with carbon. It is perfectly colourless and transparent, and half as heavy again as atmospheric air. It is incapable of combustion and also of supporting combustion, so that this substance is obviously a useless material when present in coal gas, because it cannot burn itself, and cannot, in the ordinary sense of the term, support combustion. But it is not only a useless, it is an exceedingly deleterious compound, acting in a very peculiar and deteriorating way upon the illuminants contained in the gas. We have already seen what effect an admixture of atmosperic air has upon gas, how certain per centages of air reduce the illuminating power of the gas, and we traced this action partly to the oxidation of the illuminating hydrocarbons by the oxygen, which is one of the constituents of the atmosphere. Now carbonic acid also contains oxygen, and it is capable of giving up half of this oxygen to these hydrocarbons; it is capable, in fact, of burning them in the gas-flame itself, though it cannot burn them without the concurrent help of atmospheric air and in thus acting it destroys the illuminants, as such, in the interior of the gas-flame. Atmospheric air contains only about one-fifth of its volume of oxygen, but carbonic acid contains one-half of its volume of oxygen, capable of being employed in this way; and Mr. Barlow, who was the first, I believe, to investigate this subject, found that an admixture of 1 per cent. of carbonic acid with coal gas produced a reduction in its illuminating power equal to about 7 per cent. of the light given. Not only does the carbonic acid thus oxydize the luminous constituents of the coal gas, but it exercises another deleterious influence, which must be carefully marked in estimating the sum total of the transgressions of this impurity when left in coal gas. When carbonic acid thus gives up half its oxygen to the carbon of the luminiferous hydrocarbons in the flame, it absorbs a large amount of heat, upon the retention of which in the flame depends the luminosity of the latter. The amount of heat thus abstracted from the flame is equal to that which the carbonic oxide (into which carbonic acid is transferred by this process of oxidation) afterwards gives out in burning in free air; and it is easy to calculate, from the absolute thermal effects of carbon and carbonic oxide, that those constitutents of the gas-flame which take part in the transformation just mentioned will have their temperature reduced by something like 2200° Fahr. In fact, this transformation is one of the most powerful refrigerating processes with which we are acquainted, and if it could be carried on at ordinary atmospheric temperature, it would far surpass any means at present known for producing artificial cold, but as it can only go on at bright redness, no cold, in the ordinary signification of the term, can be obtained by it. Now, that carbonic acid is present in the gas supplied to this institution we can ascertain by passing it through lime water. [Experiment performed.] You see the change which has taken place in the appearance of the liquid, owing to the formation therein of carbonate of lime. Before passing from the subject, I will just repeat Mr. Barlow's experiment, to show the great deterioration of the quality of gas by the admixture of carbonic acid. [Experiment performed—cannel gas being mixed in a small gasholder with 10 per cent. of carbonic acid, and the light from a jet supplied with this mixture compared with that of a jet supplied in the ordinary way.]

We next come to speak of ammonia. All coals hitherto examined contain some amount of nitrogen. The quantity varies considerably, and ranges from one-half per cent. to somewhat more than 2 per cent. of the weight of the coal. Now, this nitrogen never escapes in the process of manufacturing gas as free nitrogen; it comes out of the retorts almost exclusively as ammonia—that is, in combination with hydrogen, with which it unites at

the moment of being expelled from the coal. Ammonia, like carbonic acid, is a perfectly transparent gas, and very light; it has not much more than half the weight of an equal bulk of atmospheric air. It possesses a pungent odour, with which we are all familiar in smelling-salts. It can be burned under favourable circumstances, but is very difficult to consume. Thus, if I plunge a taper into a jar containing ammonia, the gas inflames slightly at the moment the taper comes in contact with it, but it cannot continue to burn for any length of time. We can burn it if supplied with pure oxygen, but in atmospheric air it is incapable of combustion, unless previously heated to redness. This condition for combustion is secured to it in the gas-flame, and the products which it forms are chiefly water and free nitrogen, which mingle with the atmosphere and have no further deleterious effect. But there is also produced at the same time a trace of nitrous acid or nitric acid. Ammonia also attacks brass and copper fittings, such as are used about gas apparatus, and corrodes them rapidly, so that it is a material not very desirable to have in coal gas. Its presence is excluded by the Act of Parliament, which prescribes that a jet of coal gas allowed to blow for a minute against turmeric paper must not discolour or turn it brown. This is one of the most delicate tests for ammonia. I will allow the gas supplied to this institution to blow upon a piece of this paper, but I do not suppose we shall perceive the slightest discoloration in the result. [Experiment performed.] Contrary to my anticipation, we have a very distinct brown spot in the centre of the yellow paper, showing that in this gas, which I have always considered one of the best supplied to London, we have this unparliamentary ammonia present in abundance. In the gas with which I am supplied at the College of Chemistry this illegal impurity is always very perceptible—it only requires that the cock should be turned for a moment to detect it; and the same is the case also at the School of Mines, in Jermyn Street.

Having thus made ourselves acquainted with some of the properties of these impurities which are present in crude coal-gas, so far, at least, as they concern us in studying this subject of gas lighting, we must now turn our attention to the methods employed in their removal. Inasmuch as coal gas cannot be manufactured without the production of these impurities, the processes for their removal are of the utmost importance in connexion with this branch of manufacture. Hitherto the attention of the manufacturer has been almost exclusively directed to the removal of one—sulphuretted hydrogen—which, it must be confessed, is the worst, but still only one of three or four of the impurities. Now this sulphuretted hydrogen may be removed—indeed, is most effectually removed, for I have never found a trace of it in London gas—by either of two processes, both of which have been employed for the purpose. One of these consists in passing coal gas through hydrate of lime (which process is going on in the apparatus before you). The chemical change which takes place in this process is an exceedingly simple one. The second substance employed for the purification is rust of iron, or hydrate of iron, as we may with propriety term it. This hydrate of iron is generally mixed with sawdust or some other porous material, so as to render it pervious to the gas. You have here an illustration of the mode of its operation, and in the following table you have the symbolic equations expressing the chemical changes which occur, 1st, in the removal of sulphuretted hydrogen by slaked lime; 2nd, in its removal by hydrate of iron; and 3rd, in the so-called revivification of the hydrosulphate of iron formed in the preceding process:—

Purification of Coal Gas from Sulphuretted Hydrogen.

By Slaked Lime.

$Ca\,Ho_2$	+	$2\,S\,H_2$	=	$Ca\,Hs_2$	+	$2\,O\,H_2$
Hydrate of Lime.		Sulphuretted Hydrogen.		Hydrosulphate of Lime.		Water.

By Hydrate of Iron.

$Fe_2\,Ho_6$	+	$6\,S\,H_2$	=	$Fe_2\,Hs_6$	+	$6\,O\,H_2$
Hydrate of Iron.		Sulphuretted Hydrogen.		Hydrosulphate of Iron.		Water,

Revivification.

$Fe_2\,Hs_6$	+	$3\,O_2$	=	$Fe_2\,Ho_6$	+	$3\,S_2$
Hydrosulphate of Iron.		Oxygen.		Hydrate of Iron.		Sulphur.

Hydrate of iron possesses a great advantage over hydrate of lime, inasmuch as it removes a larger proportion of sulphuretted hydrogen from the gas; but this is not its greatest advantage, nor is it for this that it has been adopted for purification in the metropolis. It possesses the valuable property of exchanging the sulphur removed from the gas, for oxygen, when exposed to atmospheric air. The sulphur then separates as free sulphur, and the original hydrate of iron is regenerated ready to begin work over again. This process of reconverting the hydrosulphate of iron into hydrate of iron is technically termed *revivification*. Theoretically, the same quantity of hydrate of iron can be used in the process of purification for ever; but, practically, its power comes to an end by oft-repeated operations, owing to the quantity of sulphur separated in revivification being so large as to fill up the pores of the material. It is, therefore, necessary occasionally to distil off the sulphur, and then the iron becomes useful again for the same purpose as before. Now this process of substituting first of all oxygen by sulphur, and then sulphur by oxygen, takes place so readily and rapidly, and generates so much heat, that, if a little hydrate of iron be rubbed upon a small ball of tow, and the latter be then introduced into a mixture of three volumes of oxygen and two of sulphuretted hydrogen, an immediate explosion results. In fact, the rust of iron becomes heated to redness, and if we blow a mixture of the two gases upon a mass of the hydrate of iron, the latter immediately bursts into a vivid glow.

The second of the processes of purification to which I have referred is by far the most economical for the removal of sulphuretted hydrogen, because, as I have said, the action of atmospheric oxygen restores the purifying material to its original condition (which is not the case with hydrate of lime), so that it does not require to be thrown away as utterly useless; and this process is universally employed in the metropolis. But, notwithstanding its economy, it is attended with some serious drawbacks, which will presently become evident.

With reference to the removal of carbonic acid, this is not now attempted in the gas of the metropolis, but it may be effected by the use of the material formerly employed for the removal of sulphuretted hydrogen—viz., hydrate of lime. For instance, if I take some carbonic acid, which I will collect in a tube, over mercury, and introduce into it a little pellet of tow which contains in its pores some dust of hydrate of lime, you will find that the carbonic acid almost instantly disappears. I will now take the sample of coal gas which we had intentionally contaminated with 10 per cent. of carbonic acid—and which, as you have seen, burns with a feeble flame—and pass it through a short glass tube containing hydrate of lime. The effect, you perceive, is to restore the light of the gas to its original brilliancy, because the hydrate of lime has removed all the carbonic acid. But if I now pass the same contaminated gas through hydrate of iron, no improvement whatever is produced in its illuminating power, because this hydrate of iron completely fails to take out the carbonic acid. It is on this account that the gas now supplied in London always contains carbonic acid as one of its ingredients, the purification being effected by hydrate of iron.

Ammonia, which is another of the impurities we have considered, is removed from coal gas with the greatest facility. Its removal takes place in that part of the apparatus which I described as the *scrubber*, the process consisting in the employment of moistened coke, or other porous material, over which the gas is made to travel. Ammonia is exceedingly soluble in water, and is absorbed with the greatest readiness. The same water may be used over and over again, and this is a considerable advantage, because the water, when first used, absorbs some of the useful constituents of the gas. It ought, therefore, not to be thrown away, but to be pumped from time to time to the top of the scrubber, so as to be employed over and over again to absorb more ammonia. Here is a jar of ammonia, which will serve to illustrate the facility with which this gas can be absorbed by water. I open this jar beneath the surface of water, and the water rushes up into the jar with almost explosive violence, absorbing all the ammonia in a second or two; but it is believed that there is some advantage in allowing a portion of the ammonia to remain in the gas, and this is the reason, I believe, why some of the London companies permit it to remain. The advantage supposed to be secured by this retention of ammonia is the prevention of the deposition of naphthalin in the street-mains. Naphthalin is a solid crystalline substance, which, under some circumstances, deposits itself in street-mains, and blocks them up to a considerable extent. Masses of naphthalin a foot thick have been at times deposited in this way in street-mains.

The removal of the sulphur compounds and the bisulphide of carbon is doubtless the most important problem connected with the purification of coal gas. Bisulphide of carbon is what chemists call a sulphur acid, and it possesses the power of combining with sulphur bases so as to form fixed salts. Now one of these sulphur bases is the hydrosulphate of lime used in the first purification process to which I directed attention, and this hydrosulphate of lime is capable of slowly combining with the bisulphide of carbon so as to remove a good deal of that impurity while the gas is passing through the apparatus; so that as long as this substance was used by the metropolitan gas companies there was much less of this sulphur compound contained in London gas than at present, because the hydrosulphate of iron which now constitutes their purifying material possesses no power of combining with the bisulphide of carbon. Hence it is that since the substitution of the hydrate of iron process for the lime process of purification, this compound has increased so much in London gas as to cause that unpleasant nuisance, the presence of sulphurous acid we all perceive when burning gas in an apartment not well ventilated. The amount of sulphur impurity in gas is also regulated by Act of Parliament, and it is rendered penal to allow gas to be delivered which contains more than 20 grains of sulphur in 100 cubic feet. The sulphur which is contained in coal gas, apart from the sulphuretted hydrogen, may be detected by examining the products of combustion of the gas, because during the process of combustion it combines with atmospheric oxygen and water, forming sulphurous and sulphuric acids; these may be condensed with ammonia, and if the products of combustion are passed through a glass cylinder containing a weak solution of ammonia sulphate of ammonia will be formed. It is therefore apparently easy for chemists to determine the quantity of sulphur contained in a given volume of coal gas. The process which is generally employed for this estimation of sulphur in gas is, however, unfortunately, a very defective one, for the products of combustion by no means deposit all their sulphur compounds in the glass cylinder; a considerable quantity of these compounds escape in the form of a white cloud, which you may perceive issuing from the mouth of the apparatus in which the process is going on before you. Therefore when the chemist comes to collect the liquid from the cylinder, he is minus the quantity which has escaped through the chimney. In fact one of our best-known and most intelligent gas engineers showed me the other day an improved apparatus for performing this experiment. I should have been glad to bring this apparatus before you, but it has unfortunately gone to the Paris Exhibition. The gentleman to whom I refer informed me that, by the use of the improved apparatus, he invariably obtained, at least, twice as much sulphur out of the same volume of coal gas as he did by the apparatus ordinarily employed for the purpose, and which is used in order to determine whether gas is being delivered to the public with that degree of purity which is prescribed by the Act of Parliament.

The result of examinations, by Dr. Letheby, for the estimation of sulphur in coal-gas is exhibited in the following table:—

Amount of Sulphur in the Gas supplied to the City, by the City of London, the Chartered, and the Great Central Companies, in the Year 1865-66.

Name of the Company.	Amount of Sulphur in the Gas supplied to the City.					
	Quarters ending in	No. of Experiments.		Grains of Sulphur per 100 Cub. Feet.		
		Total.	Inexcess.	Max.	Min.	Average
City of London	May	59	7	22·5	14·2	17·5
	August	51	10	25·0	15·5	18·7
	November	55	19	25·1	16·4	19·5
	February	55	51	28·2	18·0	22·7
	Year	220	87	28·2	14·2	19·6
Chartered	May	59	12	24·6	13·0	19·0
	August	51	21	26·3	14·6	19·6
	November	55	34	28·4	15·7	21·5
	February	59	59	30·7	20·8	24·7
	Year	224	126	30·7	13·0	21·2
Great Central	May	55	51	28·0	19·5	23·7
	August	51	51	32·1	21·8	25·8
	November	55	52	30·3	19·2	22·7
	February	59	58	32·9	14·4	24·3
	Year	220	212	32·9	14·4	24·1

Now when you consider that by the process used in the above examinations of the gas, only about one half of the sulphur is collected, the quantity actually present in the gas as it reaches the consumers is double that which is represented in this table. And I may say that I convinced myself, by working the improved apparatus, that notwithstanding the improvement made, some of the sulphur was still escaping; it was not entirely arrested, though to a much greater extent than in the apparatus before you. You may therefore conceive of the extent to which this impurity is present at this moment in London gas, and when you consider that every 20 grains of sulphur thus contained in gas produces 40 grains of sulphurous acid—the stifling sulphurous acid which is gradually and under favourable circumstances changed into oil of vitriol, of which it will then form 61 grains—you may imagine the extent to which the atmosphere of rooms in which gas is burned in order to give a tolerable light must be deteriorated by its use.

Now, with regard to the gas which is manufactured in other towns in the United Kingdom, Dr. Letheby states that, of 24 towns in which he examined the gas, in 19 of them the quantity of sulphur was less than 15 grains in the 100 cubic feet, while in 7 it was below 10 grains. The gas was tested by the same apparatus which he used in the metropolis, and, therefore, these quantities must be doubled; still, it is clear that the gas of London is, as regards this impurity, considerably worse than that supplied in other towns of the kingdom.

We must now pass on to the consideration of the diluents present in coal gas. After the removal of the impurities, gas contains the two classes of ingredients—diluents and illuminants. The diluents are hydrogen, carbonic oxide, and marsh gas. The proportion of these diluents present in the gas supplied to London and Manchester respectively will be apparent to you on an examination of the following table:—

Composition of London and Manchester Gas.

Constituents.	Name of Company.				
	City.	Gt. Central	Imperial.	Chartered.	Manchester Corporation.
Illuminating hydrocarbons	3·05	3·56	3·67	3·53	10·81
Marsh gas	41·50	35·28	40·66	35·26	41·99
Hydrogen	47·60	51·24	41·15	51·80	35·94
Carbonic oxide	7·32	7·40	8·02	8·95	10·07
Carbonic acid	0·53	0·28	0·29	..	1·19
Nitrogen	..	1·80	5·01	0·38	Traces.
Oxygen	..	0·44	1·20	0·08	Traces.
	100·00	100·00	100·00	100·00	100·00

I should mention that these samples of gas were collected in the year 1851, but the composition of these gases has not varied very much since that time with regard to the illuminating hydrocarbons and diluents, though they have with respect to the presence of carbonic acid. At that time the City of London Company's gas contained only ·53 grain, whereas the Manchester gas contained 1·19 grain, or more than that of any of the metropolitan companies.

The first of these diluents which I briefly glance at is hydrogen. The combustibility of this gas we have sufficiently proved. It produces on combustion water, and nothing but water. It produces no carbonic acid. Its quality which is most important to us is its great diffusibility through porous substances, and more particularly through gas-pipes, which appear to be always more or less porous. This diffusibility of gases is shown in the following table, where you will see the great prominence of hydrogen in this respect:—

Diffusion and Effusion of Gases.

Gas.	Density.	Square root of Density.	$\frac{1}{\sqrt{\text{Density.}}}$	Velocity of Diffusion. Air = 1.	Rate of Effusion.
Hydrogen	0·06926	0·2632	3·7994	3· 83	3· 613
Marsh gas	0· 559	0·7476	1·3375	1· 344	1· 322
Steam	0· 6235	0·7896	1·2664	—	—
Carbonic oxide	0· 9678	0·9837	1·0165	1·0149	1·0123
Nitrogen	0· 9713	0·9856	1·0147	1·0143	1·0164
Olefiant gas	0· 978	0·9889	1·0112	1·0191	1·0128
Binoxide of nitrogen	1· 039	1·0196	0·9808	—	—
Oxygen	1· 1056	1·0515	0·9510	0·9487	0· 950
Sulphuretted hydrogen	1· 1912	1·0914	0·9162	0· 95	—
Protoxide of nitrogen	1· 527	1·2357	0·8092	0· 82	0· 824
Carbonic acid gas	1·52901	1·2365	0·8087	0· 812	0· 821
Sulphurous acid gas	2· 247	1·4991	0·6671	0· 68	—

It is, however, important to recollect, in connexion with this process of diffusion, that while the hydrogen is passing outwards through the gas-pipe, atmospheric air is passing inwards through the same pores. This exchange must take place, and the amount of air which passes into the pipe is proportionate to its rate of diffusion, so that nearly four volumes of hydrogen will pass out of the pipe in the same time that one volume of air enters. Now, if the atmospheric air did not enter the pipe in exchange for the hydrogen which passed out, we should have the quality of gas improved by this operation, inasmuch as hydrogen is only a diluent, and its removal would leave a larger proportion of illuminants, which have a much lower power of diffusion than the diluents. But the fact is well known that the passage of gas through a long series of mains tends to deteriorate its illuminating power into the pipes of atmospheric air, which destroys more light than we gain by the outward passage of the hydrogen, although the deterioration is generally ascribed to the condensation of the hydrocarbons in the main. No doubt this is occasionally a true cause of the deterioration, but the admission of air into the pipes, which destroys more illuminating power than is gained by the extension of the hydrogen, is a still more potent cause of the deterioration of gas during its passage through long mains. In the table we have already referred to, showing the composition of London and Manchester gas, you will see a proof of this. The City Company's gas was entirely free from oxygen—that gas was collected at the works; the Great Central Gas Company's gas, which was taken at some distance from the works, contained 44 per cent. of oxygen; the Chartered Company's gas taken, not at the works, but not far from them, contained only ·08 per cent.; and in the Manchester gas, taken at the works, there were only traces present.

The remaining diluents which possess properties in regard to their functions in coal gas similar to hydrogen, though they have not its high diffusibility, we can only shortly glance at. I must, in fact, content myself by referring to the following table, which shortly expresses what I have to say on this subject:—

Properties of Diluents.

One cubic foot of hydrogen, at 60° Fahr. and 30° in barometric pressure, consumes half a cubic foot of oxygen, generates no carbonic acid, and heats 1 lb. 13 oz. of water from 32° to 212° Fahr., or 2500 cubic feet of air from 60° to 66·4°.

One cubic foot of carbonic oxide consumes half a cubic foot of oxygen, generates 1 cubic foot of carbonic acid, and heats 1 lb. 14 oz. of water from 32° to 212°, or 2500 cubic feet of air from 60° to 66·6°.

One cubic foot of marsh gas consumes 2 cubic feet of oxygen, generates 1 cubic foot of carbonic acid, and heats 5 lb. 14 oz. of water from 32° to 212°, or 2500 cubic feet of air from 60° to 80·8°.

You see, from this table, that marsh gas, or light carburetted hydrogen, as it is called, is the least desirable of these diluents.

Sixth Lecture.—Saturday, March 23.

Purified coal gas contains, as we have seen, two classes of constituents. To one of these we have applied the name diluents, because they perform a function in coal gas which can be most properly termed a diluting function. They do not, to any very appreciable extent, contribute to the light we obtain in a coal-gas flame, but they do so indirectly, in a manner which we must now consider. These gases though not themselves luminous in burning, are capable of absorbing or taking up the vapours of luminiferous hydrocarbons, such as enter into the composition of coal tar and coal naphtha, the solid and liquid products of the destructive distillation of coal. Whilst these volatile compounds condense to a great extent out of the crude gas after it leaves the retorts, a certain proportion of them remains diffused in the diluents in the shape of invisible vapour. The importance of this function of these diluents you will see in a moment, when we ascertain their action in thus taking up volatile vapours. I have here some benzole, one of the volatile constituents formed in the destructive distillation of coal. It contains six atoms of carbon and six atoms of hydrogen. This body contributes in no very unimportant degree to the total amount of light produced in a coal-gas flame, and the part which the diluents perform. The illuminants themselves also sharing this duty, is the taking up a certain quantity of these vapours, such as benzole, and carrying it with them to the burners, where it then contributes to the total light of the flame. I will pass through this flask containing benzole a stream of hydrogen gas. The same tube which conveys the hydrogen gas to the flask conveys a portion of the same gas to this fishtail burner, where, as you perceive, it burns without any luminosity, but if I ignite the hydrogen after it has passed through the flask, the flame emits a considerable amount of light. In fact, if we had such gas as this to burn in ordinary use, we should be well content, but we do not get in ordinary gas anything like such an amount of benzole vapour as is present in the flame now burning before us.

In addition to this function of taking up and carrying forward these volatile hydrocarbons, one of these diluents—viz., light carburetted hydrogen or marsh gas—is capable also, under very favourable circumstances, of producing a certain amount of light. We do not get any light from it under the ordinary circumstances surrounding the combustion of gas, but by taking advantage of an elevation of temperature in the air which supplies the gas flame, we may obtain a certain degree of luminosity, so that this marsh gas may be said to stand upon the line of demarcation between the diluents and the illuminants. If I employ the charcoal furnace which we used before for showing the increase of light by heating the air and gas before combustion, and pass through the tube in the centre of it a stream of marsh gas, you perceive from the luminosity of the flame that we have converted our diluent into an illuminant of no inconsiderable power. This is doubtless one of the causes of the great increase in the illuminating effects we obtain by heating the air before it comes in contact with an ordinary gas-flame, inasmuch as this marsh gas enters very largely into the constitution of coal gas, as seen from the diagram exhibited in the last lecture. By thus bringing out the illuminating effect of the marsh gas, we must obviously get a considerable increase of light.

A word as to the comparative value or rather innocuousness of the diluents. Unfortunately in the manufacture of gas we have very little choice as to which of these diluents shall dilute our gas, but if we could choose between them, we should probably select hydrogen in preference to the other two. For, in the first place (although it must be admitted that each of the three has both its merits and its defects), hydrogen is perfectly innocuous itself; it may be breathed with impunity, and exerts no deleterious influence upon the system; it also forms a perfectly innocuous product of combustion—viz., water. It produces too, on combustion, an amount of heat less than that produced by burning a certain quantity of gas in an apartment; the diluent of the gas being hydrogen, we should have the temperature of the apartment slightly lower than if the diluent were carbonic oxide, and much lower than if it were marsh gas. But hydrogen has this defect, that it is more likely to produce an explosive mixture with the air of the apartment into which it might accidentally escape in an unburnt state. Any leakage of gas of that kind would be fraught with much more danger, because the range of explosiveness in mixtures of hydrogen with air is much wider than that of mixtures of marsh gas or carbonic oxide with air.

Now carbonic oxide scarcely elevates the temperature of a room perceptibly more than hydrogen, and it forms an explosive mixture with more difficulty than either hydrogen or marsh gas; but it is excessively poisonous. It is the material which, in all probability, kills in the process of suffocation by the fumes of charcoal. In fact, when present to the extent of 2 per cent. in atmospheric air it would probably prove fatal, and, certainly, recovery from its effects would be much more doubtful than from the effects of a similar quantity of carbonic acid. Again, too, in burning it produces its own volume of poisonous carbonic acid.

The third diluent—viz., marsh gas—is in itself perfectly innocuous. The labourers in coal mines can breathe an atmosphere containing 11 per cent. of this gas without any deleterious result, and they are, in fact, unconscious of its presence from any effect it produces on the system, or from any odour proceeding from it. I have myself breathed for half an hour in an atmosphere of this kind without being at all conscious of the presence of the marsh gas, except the intimation given by my safety-lamp that the atmosphere was explosive. It is also less likely than hydrogen to form explosive mixtures, supposing it to escape accidentally from a gas-pipe. Under peculiarly favourable circumstances, as we have seen, it is capable of furnishing a not unimportant quantity of light, but it consumes four times as much oxygen as either carbonic oxide or hydrogen, and it generates on combustion the same noxious compound as the former—viz., carbonic acid. Further than this, it

also heats the atmosphere in which it is burnt three times as much as the same volume of carbonic oxide or hydrogen; so that, upon the whole, we should be inclined to give the preference to hydrogen, notwithstanding its greater tendency to form an explosive mixture with air.

We now come to the consideration of the third class of constituents present in crude coal gas—viz., the illuminants. The chief illuminating constituents in coal gas are mentioned among many other bodies in the following table:—

Products of the Destructive Distillation of Coal.

		Boiling Points.
Hydrogen	$H\ H$	—
Marsh Gas, or Hydride of Methyl	$C\ H_3\ H$	—
Hydride of Hexyl	$C_6\ H_{13}\ H$	—
Hydride of Octyl	$C_8\ H_{17}\ H$	—
Hydride of Decyl	$C_{10}\ H_{21}\ H$	—
Paraffin	$C_n\ H_{2n+2}$	—
Olefiant Gas, or Ethylene	$C_2\ H_4$	—
Propylene, or Tritylene	$C_3\ H_6$	—
Butylene	$C_4\ H_8$	—
Caprylene, or Hexylene	$C_6\ H_{12}$	55
Œnanthylene, or Hephylene	$C_7\ H_{14}$	—
Acetylene	$C_2\ H_2$	—
Benzole	$C_6\ H_6$	80·5
Parabenzole	$C_6\ H_6$	97·5
Tobuole	$C_7\ H_8$	114
Xylol	$C_8\ H_{10}$	126
Cumol	$C_9\ H_{12}$	150
Cymol	$C_{10}\ H_{14}$	175
Naphthalin	$C_{10}\ H_8$	212
Paranaphthalin, or Anthracene	$C_{14}\ H_{10}$	—
Chrysen	$C_6\ H_4$?	—
Pyren	$C_{15}\ H_4$	—

Now, of these different families of illuminants, the olefient gas family and the benzole family contribute by far the larger amount of light to the gas-flame. How very little is contributed by the first, or hydrogen group, we may convince ourselves by passing cannel gas through bromine. The gas enters the bromine of its ordinary illuminating power, and you will see by the experiment I am about to perform, how much of this power it loses in the passage. [Experiment shown.] The illuminating effect still left is due to the class of bodies which belong to the hydrogen family—viz., hydride of octyl and hydride of hexyl.

The first of the illuminants which it will be necessary for us to notice somewhat in detail is acetylene, which, on account of its recent investigation, and from certain peculiarities it possesses, has a more special interest for gas manufacturers, rather than for gas consumers. Still, in connexion with the subject of gas lighting, it is not a substance we ought to pass over without some notice. Acetylene is a constituent of coal gas, and is probably never absent from that gas. It possesses the peculiarity of producing a red precipitate when brought into contact with subchloride of copper, forming acetylide of copper. This acetylene may be produced by a variety of processes. The one which, perhaps, most interests us, as being that from which possibly the acetylene in coal gas is derived, consists in applying a very high degree of heat to marsh gas. Marsh gas, if heated much higher than when it is ignited in atmospheric air, is transformed into acetylene. That it does not suffer this transformation when burnt in atmospheric air, we know from the lightless flame which it gives. Acetylene is an illuminant of a very high power, and it is not improbable that when atmospheric air is previously heated for the supply of the marsh-gas flame, acetylene is produced, which forms the illuminating ingredient in that flame under such circumstances. Here is a little apparatus by which the production of acetylene from marsh gas can be illustrated. Here is a gasholder containing marsh gas, and I will pass the gas through a flexible tube into a glass vessel containing pieces of coke, placed at the ends of the copper wires which carry the electric current from an induction coil. Through this glass vessel the stream of marsh gas passes into a flask containing an ammoniacal solution of subchloride of copper. The result is that the surface of the liquor immediately becomes red, with a floating film of acetylide of copper, and you may observe how rapidly the blue solution is also becoming of a red colour. The electric sparks strike through this stream of marsh gas, and heat the particles of marsh gas which are near to it; very highly, indeed, far beyond the temperature to which we can heat them, even when burning marsh gas if heated air.

In the second place, acetylene can be produced, and, in fact, it was thus first produced by Edmond Davey, by bringing into contact with water—a singular compound obtained in the manufacture of the metal potassium. When this metal is obtained from a mixture of carbonate of potash and charcoal, there is formed a compound of potassium with carbon, which deposits in the neck of the retort, and is a great obstacle to the production of potassium. Edmond Davey found that when this substance was brought into contact with water, this substance gave off a peculiar gas which possessed a very high illuminating power, and contained in the same volume only half as much hydrogen as olefiant gas. Much more recently this gas has been rediscovered by Professor Berthelot, who has succeeded in producing acetylene directly from its elements. He has found that by igniting very intensely a piece of carbon in an atmosphere of hydrogen, acetylene is formed though not in large quantities. This experiment is very interesting in connexion with the theory of the light of a gas-flame, for it might perhaps be objected, in connexion with this theory, that the luminous hydrocarbons I have spoken of as the sources of light, would be decomposed at the high temperature of the flame. It is true that some are decomposed at a bright red heat; but here is one which is actually generated from its elements at a temperature infinitely higher than that of any gas-flame; for M. Berthelot employs the highest temperature ever produced—viz., that of the electric arc—for the production of this illuminant. Here is a glass cylinder through which a current of hydrogen is passing. Through two openings in this cylinder pass the coke poles of a powerful galvanic battery. If I bring these poles together I get in the interior of the hydrogen the electric light. This light is, as you are aware, produced by the intense ignition of the carbon poles which are conveying the current, and these pieces of carbon are here ignited in an atmosphere of hydrogen. This hydrogen, after passing through the cylinder, is conveyed through a flexible tube, and into a vessel containing ammoniacal solution of subchloride of copper.

The fourth process by which acetylene is produced is the imperfect combustion of hydrocarbon gases or vapours. A convenient contrivance for the carrying out of this process has been devised by Mr. Mc'Leod, and is now upon the table before you. It consists, in fact, of the apparatus which we used in a previous lecture for burning atmospheric air in coal gas. There is a tube conveying atmospheric air into the interior of a cylinder, and a second tube conveying coal gas into the same cylinder. They are both drawn in by the action of a powerful water aspirator, which causes the stream of gases to pass rapidly through the apparatus. The kind of combustion which goes on when air is admitted into coal gas instead of coal gas into air is favourable to the formation of acetylene. A large quantity of this body is formed under the circumstances, and it passes through these cylinders, which are filled with an ammonical solution of subchloride of copper.

The red compound produced in all these processes is very convenient for the preparation of pure acetylene, inasmuch as it separates the acetylene from the other gases, and can afterwards be made to yield it up in its pure condition. Here is a specimen of this acetylide of copper. It is a red, amorphous substance which is perfectly insoluble in water, it explodes when struck with a hammer, or on being suddenly heated to a temperature only a little beyond the boiling point of water. This body, which is thus capable of exploding by friction and by elevated temperature, is probably the cause of certain gas explosions which have occurred from time to time, and of which the reason could never be discovered. This substance is liable to be formed when coal gas comes in contact with the brass fittings of gas-meters, and there are some instances on record in which gas-meters, having been detached from service-pipes and brought out into the open air, have suddenly exploded on the workmen proceeding to unscrew some of the brass fittings. The presence of minute quantities of acetylide of copper which, by the friction caused by the unscrewing of the joints, have been exploded and have ignited, and the mixture of coal gas and air in the meter, would account for such accidents.

Acetylide of copper dissolves without decomposition in dilute hydrochloric acid, but if the solution be heated, it is immediately decomposed, chloride of copper being formed and acetylene gas produced.

Acetylene is a colourless and transparent gas, having a peculiar and rather unpleasant odour; its specific gravity is slightly less than that of air, being ·92, or just 13 times heavier than hydrogen; it is tolerably soluble in water, and burns with an intensely luminous flame. [Experiment performed—acetylene gas being burnt from a fishtail burner]. Acetylene, when added to chlorine, explodes by the action of diffused daylight even, but especially of the diffused electric light. This explosion is attended with a very slight report, but with the evolution of a large quantity of carbonaceous smoke. [Experiment performed]. If we reverse the experiment, and add the chlorine to the acetylene, then the explosion takes place immediately, even in perfect darkness. [Experiment performed]. It is difficult to account for this difference in effect in the two cases.

The next illuminant that we must notice is olefiant gas, which is a colourlesss transparent, and therefore invisible gas. It burns with a beautifully brilliant flame, not nearly so bright as that of acetylene, however, because it contains in an equal volume the same amount of carbon, and twice as much hydrogen, as the last-named gas. It is slightly soluble in water, requires about twelve times its bulk for solution.

The next illuminant, which also belongs to a different family, is benzole. This is contained in coal tar, and also in coal naphtha, which is distilled from coal tar. It is a limpid, colourless liquid, which refracts light strongly, solidifies at the freezing point of water, and boils at 177° Fahr. A large quantity of this vapour can, therefore, be taken up by the diluents in coal gas, as was seen when we passed hydrogen gas through a flask containing this liquid. Some time since this material was proposed to be used for what may be termed portable gas. The contrivance for thus bruning benzole consisted in first mixing it with about two volumes of alcohol, and then introducing the mixture into a glass globe, in the neck of which was inserted a brass tube, containing an ordinary wick, reaching nearly to the top of the tube. The top was closed by a cap, and around the circumference of the cap was a row of little apertures. On heating the top of the wick, which was saturated with benzole, the temperature of the brass above the wick soon became sufficiently high to volatilize the benzole, and the gas or vapour of the benzole then burnt in little jets.

Another illuminant to which I have alluded is naphthaline, which is a very beautiful substance in appearance—one of the most beautiful crystalline bodies with which chemists are acquainted; but, whilst it is nearly valueless to the consumer, it is a great annoyance to the manufacturer of gas; for this substance, being volatile, is carried along with the gas into the street-mains as a colourless and invisible vapour, and then with the gradual diffusion of the hydrogen and other constituents through the pipes; and also by the lowering of the temperature in the pipes the gas becomes super-saturated with the naphthaline, so that large masses become deposited in the mains, and produce obstructions which it is very difficult to remove. This naphthaline is capable of contributing very largely to the illuminating effect of a gas-flame, if it can be introduced at a sufficiently elevated temperature; but under all practical circumstances we may put its illuminating power in a gas-flame at *nil*. We have here some hydrogen gas which is passing over naphthaline at the ordinary temperature, and you observe that on lighting it we do not get any additional luminosity. But if I warm the naphthaline, so that its vapour may pass up with the hydrogen, we get a brilliant flame; indeed, far more smoky matter is produced than can be consumed.

Now, as to the comparative value of the different luminiferous compounds in coal gas. The following table gives you the result of experiments in this direction:—

Relative Value of Illuminants contained in various Cannel and Coal Gases.

	Volume and Light of Illuminants containing same Weight of Carbon as 1 Cubic Foot of Olefiant Gas.	
	Volume.	Light.
Cannel Gas.		
Boghead	0·79 cubic feet	2·80 candles.
Lesmahago	0·58 ,,	2·58 ,,
Newcastle	0·57 ,,	2·88 ,,
Wigan	0·71 ,,	2·95 ,,
Methley	0·78 ,,	3·04 ,,
Coal Gases.		
Newcastle	0·54 ,,	4·23 ,,
City Gas Company's	0·44 ,,	3·73 ,,
Great Central	0·49 ,,	3·91 ,,

From this table it will be perceived that the illuminating effect of the hydrocarbons contained in cannel gas is directly proportional to the amount of carbon contained in a given volume. Thus ·57 cubic foot of the luminous hydrocarbons in Newcastle cannel gas, contains as much carbon as ·79 cubic foot of the hydrocarbons in Boghead cannel gas, and these volumes give also the same amount of light on combustion. The same appears to be the case with the illuminating hydrocarbons in coal gases when compared together; but the carbon in these last has a higher absolute illuminating value, weight for weight, than that contained in cannel gases. Thus equal weights

of carbon in the hydrocarbons of Lesmahago cannel gas and Newcastle coal gas, give, respectively, the light of 2·58 and 4·23 candles. The cause of this difference is probably due to the carbon in the hydrocarbons of coal gas being associated with less hydrogen than that in the hydrocarbons of cannel gas. The hydrocarbons of the latter are of the same type of acetylene, whilst those of coal gas have more resemblance to olefiant gas in their constitution.

Now, in the evolution or generation of gas in the process of manufacture, the quality of the gas depends, to a considerable extent, upon the conditions observed in the operation. And the first and most important condition is the material which is employed in the manufacture. We have on the table before us various specimens of cannel and coal. There is also a specimen of a valuable material recently discovered in New Brunswick—the Brunswick cannelite—for which I am indebted to Mr. Archibald, and which produces gas in large quantities and of good quality. The illuminating power of gas from different descriptions of coal, is expressed in the following diagram:—

Illuminating Power of Gas from various Coals.

Name of Coal.	Consumption of Gas per Hour.	Light in Standard Sperm Candles.
Brunswick cannel	5 cubic feet	52·6
Lesmahago	5 ,,	40·0
Brunswick cannelite	5 ,,	37·8
Newcastle cannel	5 ,,	34·4
Methill	5 ,,	27·8
Wigns	5 ,,	22·1
Newcastle coal	5 ,,	14·9

The value of these materials, for gas-making purposes, varies with the proportion of hydrogen to carbon in the coals, but appears to be independent of the proportion of oxygen to carbon, as may be seen from the following comparison:—

Proportion of Carbon to Ozygen and Hydrogen in various Gas Coals.

	C.	H.	O.
Wigan	100	7·67	12·08
Boghead	100	13·96	8·36
Lesmahago	100	10·38	13·29
Pelton	100	6·21	10·38
Methill	100	11·79	13·99

Then the temperature at which gas is manufactured exercises a very material effect upon the quality of the gas. If the temperature be too high, if the retorts be heated too strongly, a large volume of gas is produced, but it is of inferior illuminating power, and of inferior quality as regards the irremovable sulphur compounds. In fact, in such an operation some of the gaseous hydrocarbons, which ought to be decomposed in the flame, are decomposed before they leave the generating apparatus, so that the production of gas at a great heat results in a great loss of illuminating power, though the quantity of gas manufactured is much larger. If, on the other hand, the temperature be too low, you fall into the opposite error, but you do not get a higher-quality gas; on the contrary, you get a lower quality than is produced at a bright red or cherry heat, which is about the proper temperature for making gas. You will see this strikingly illustrated in the manufacture of paraffin oil, in which large quantities of gas are produced of excellent quality as regards purity, and also of a tolerably high illuminating power. The results of the analyses of gases so produced from the Leeswood cannel, which is a very good cannel, giving at a bright red heat gas equal to Lesmahago—5 cubic feet giving the light of 40 candles—is seen in this table:—

Composition of Gas from Leeswood Cannel, distilled for Paraffin Oil at 770° Fahr.

Illuminating hydrocarbons	10·93
Marsh gas	44·99
Hydrogen	26·38
Carbonic oxide	4·61
Carbonic acid	13·09
Sulphuretted hydrogen	traces
Bisulphide of carbon	0·00
	100·00

Illuminating power of purified gas, 5 cubic feet per hour=25 candles. One ton of cannel gives 4000 cubic feet of gas.

The principal point about this gas is that sulphuretted hydrogen is present in a very small quantity only, and the bisulphide of carbon is entirely absent. The illuminating power of this gas when purified from the large quantity of carbonic acid contained in it, and burning 5 cubic feet an hour, is equal to 25 candles, and in this process one ton of cannel, which under ordinary circumstances would yield 11,000 or 12,000 cubic feet of gas, gives only 4000 or 5000; so that low temperature, although very favourable to purity of the gas, is unfavourable to a good result as regards volume and illuminating power.

Then again, it is important to prevent undue pressure on the interior of the retorts, because the hydrocarbons are more rapidly decomposed by the high temperature when under pressure than when rarefied and allowed to pass out of the retort without experiencing the pressure induced by the purifying apparatus placed between the retorts and the gasholder. I have already explained the position of the exhauster, and the action of this apparatus in preventing undue pressure in the retorts.

The following table exhibits a comparison of the cost of gas with that of other sources of light, from which the enormous advantage of gas as an illuminating agent will be seen:—

Comparative Cost of the Light of 20 Sperm Candles, each Burning for 10 Hours, at the Rate of 120 Grains per Hour.

Wax	7s. 2½d.
Spermacetic	6 8
Tallow	2 8
Sperm oil	1 10
Coal gas	0 4¼
Cannel gas	0 3
Paraffin	3 10
Paraffin oil	0 6
Rock oil	0 7¾

I have, lastly, to bring before you a table of the illuminating power of the gas supplied to the metropolis and that supplied to other large towns. Through the kindness of my friends in various places, I have been able, almost at the last moment, to get estimations of the illuminating power of the gases used in the principal European capitals, and in many of our British towns and cities, and the results of my inquiries are contained in this table.

Comparative Illuminating Power of the Gas supplied to various Cities and Towns.

Name.	Authority	Illuminating Power in standard Sperm Candles.
European Capitals.		
Berlin	Hofmann	15·5
Paris	Frémy	12·3
London	Letheby	12·1
Vienna	Redlenbacher	9·0
Edinburgh	Penny	28·0
British Cities and Towns.		
Manchester	Leigh	22·0
Liverpool	King	22·0
Glasgow	Penny	28·0
Aberdeen	,,	35·0
Greenock	,,	28·5
Hawick	,,	30·0
Inverness	,,	25·0
Paisley	,,	30·3
Carlisle	,,	16·0
Birmingham	Frankland	15·0

The illuminating power given by Dr. Letheby, in London, of 12·1 candles is by the parliamentary burner, the unsophisticated burner mentioned and described in the Gas Act of 1860. In the improved Sugg's burner about 1½ candle more light would be obtained, owing to the better construction of that burner. In almost all the cases quoted in this table I have the certificates of the gentlemen, who have tested the gas at a recent period. The gas supplied to Berlin is partly manufactured from English cannel coal.

The following, with reference to the metropolitan gas supply, I take from Dr. Letheby's report on the gas delivered to the City. He states that, measured by the old parliamentary burner, the illuminating power of the gas supplied to the City before the passing of the Metropolis Gas Act in 1860, and when gas was sold at 4s. per 1000 cubic feet, was 13·2 candles; since the passing of the Act, and when the price of gas has been raised to 4s. 6d., it has been only 12·1 candles. This is the average in both cases, but it has been as low as 9·6 in the case of the Chartered gas. There is no doubt that this depreciation is due chiefly to the retention of the carbonic acid in the gas by the new system of purification, for this carbonic acid remaining in the gas would deteriorate it to the extent of 11 or 12 per cent., which would just make the difference in illuminating power between 13·2 and 12·1 candles.

What, then, is our position in this great and wealthy City with regard to the supply of gas—in this the metropolis of the country which annually yields such vast quantities of the finest gas coals in the world, and sends these coals half round the earth to illuminate the cities of other nations? An inspection of the table I have just referred to fails to convince me that we are fairly and considerately treated in this respect. Perhaps as consumers we are rather partial in the matter; but still we are entitled to be heard from our point of view. To obtain the light with which the inhabitant of Edinburgh or Glasgow illuminates his drawing-room, we have to burn double the amount of gas, and to have the atmosphere of our drawing-rooms contaminated with double the heat and moisture, and many times the amount of sulphurous acid. Some sixteen years ago I examined analytically and photometrically the gas supply of the metropolis, and I have no hesitation in saying that it was better then than now. How is this to be accounted for? Has invention, which has been so busy in improving other manufactures, left that of gas untouched? By no means. Improved retorts, exhausters, and purifying processes have been brought forward in abundance. Have, then, the gas companies disregarded these improvements? By no means. Whenever the improvement promised to reduce the cost of the manufacture of gas, they have eagerly adopted it. Thus, within the time I have just mentioned, they have revolutionized their process of purification, having adopted a method which greatly decreases the cost of that purification, and increases the volume of the gas, but which reduces its illuminating power by 11 per cent., and makes it utterly unfit for use in dwelling-houses, by leaving it contaminated with those sulphur compounds which, on combustion, impregnate the surrounding air with stifling fumes of sulphurous acid. Thus an improvement which reduces the cost of production, but seriously deteriorates the quality of the gas, has been universally adopted, whilst inventions which have had for their object the improvement of the quality of the gas as delivered to consumers, but which have offered no advantage to the producer, have been, without exception, utterly ignored. I do not enter into the subject of price, though something might be said on this head, because, in a wealthy city like this, cost is, with most consumers, a secondary consideration. The man who spends thousands in furnishing his mansion has a right to expect, in the present state of science and manufactures, that his house shall be lighted with a material that shall not damage and destroy the works of art and the things of beauty with which he surrounds himself. He has, I conceive, a right to demand that, in this respect, he shall not be treated worse than the inhabitants of second or third rate towns. He is willing to pay any fair price for such an article, since, if the present price were double, it would still be far cheaper than any other illuminating agent; but he must have *good quality*, for without it, this grand invention of the century is lost to him. Let the metropolitan companies see to this in a liberal spirit, and let the consumers understand that low-priced gas is not necessarily cheap gas, and then we shall soon, I hope, have a gas of not less illuminating power than 20 candles per 5 cubic feet per hour, below which quality no gas is fit for domestic use.

THE DRAINAGE OF CANTERBURY.

On Tuesday, the 16th inst., the General Purposes Committee of the Canterbury Town Council met in the Guildhall to consider the engineer's (Mr. Pilbrow) report on the drainage and water supply of the city.

The MAYOR occupied the chair, and there was only one member of the corporation absent.

The MAYOR having observed that the proper persons to commence discussion on the subject were those who had postponed the matter,

Alderman MASTERS said that in the absence of any one of those gentlemen at whose instigation the drainage question had been deferred now taking up the matter he would do so, feeling as he did as strongly as ever that, looking at the present inefficient system of drainage—that it did not apply alike to all buildings, and was without proper levels—some new and permanent system should be adopted. This they ought to do, not only for themselves as living in the city, but in order to make Canterbury as healthy as possible,

and induce others to come into it. At the present time the city was not in that healthy state that was to be desired, and this arose principally from the fact that they had not done all that they might have to ward off the afflictions to which humanity is heir. He would then repeat, looking at the promotion of health and the improvement of property, it was their duty, not only to themselves but their children, to construct a sound and good system of drainage. They had received from their engineer, Mr. Pilbrow, an excellent report on the question, and time had been allowed every member of the court for making himself acquainted with its details. If it could be said, as he (Alderman Masters) believed, that as a broad and general principle no better plan could be carried out than that suggested by their engineer, it ought to be adopted. Mr. Pilbrow's report evidenced that he was possessed of considerable ability, and he (Alderman Masters) knew he was a man of integrity and honour. He begged to move—"That the system of drainage as proposed by the engineer, Mr. Pilbrow, be adopted, subject, however, to any modification or alteration that may be agreed upon in a conference with that gentleman and a committee of councillors; and that it be an instruction to such committee to consider the practicability of using any of the existing drains."

Alderman BOORMAN said the committee ought to consist of the whole house.

Alderman MASTERS answered that that would have to be determined presently.

Alderman COLLARD, after observing that it would have been more consistent had those members of the court who had had the question of drainage deferred now stated their opinion on Mr. Pilbrow's report, went on to say that at first the report and plan did not strike him as being adapted to the requirement, but a close investigation had compelled him to alter his opinion to such an extent that he could see every reason why he should support the proposition of Alderman Masters. A good deal having been said about the working of Mr. Pilbrow's scheme of drainage in other towns, he sent his son to one of them—Uxbridge—and he held in his hand a most favourable account of its working. Although at the time the works were executed there were not such parliamentary powers in existence as would have further promoted the success of the undertaking, still it was highly satisfactory. The filtration of matter realized sufficient to pay for the cost of working, and what they in Canterbury wanted to do was to carry out improvements and make their sewage works pay. He had much pleasure in seconding the resolution.

Alderman BRENT suggested that for the sake of unanimity Alderman Masters should alter his proposition, so that the committee might consist of the whole house. With reference to what had been said about adjourning this question from time to time, he (Alderman Brent) considered it had been productive of good, since they now had the matter before them in a clear and tangible form, and apart from the water supply, which was happily settled, and the corporation relieved from the risk of a joint-stock undertaking. Before a determination was come to to carry out Mr. Pilbrow's plans in their entirety, he should like to know whether some part of the existing system of drainage could not be made available—because it did not appear reasonable that all should be condemned at once. It was in order that this information might be gleaned that he suggested an amendment that the committee should consist of the whole council. It was desirable that they should be unanimous, because what both sides of the house wanted to see was a good and efficient system of drainage carried out; not that Canterbury was unhealthy; on the contrary, he believed it to be the healthiest town in Kent compared with its population, and that there was no foundation for the mendacious paragraph which appeared in the *Times*, stating that the contrary was the case. In conclusion, he begged the mover of the motion to accede to the proposition he had made, because they wanted to hear from Mr. Pilbrow whether he could not make some use of the existing drains other than, as he proposed, for carrying off the surface sewage, and thereby save the citizens some of the £18,000 it was proposed to expend.

Mr. W. J. COOPER declared that Canterbury was not so unhealthy as had been represented, and asked how the money for the proposed drainage works was to be obtained.

The TOWN-CLERK answered that the Board of Trade had power to lend the money.

Mr. W. J. COOPER observed that the body mentioned would not do so; and in support of this statement quoted the case of Ramsgate, where the local board had made application for £3000 on mortgage of the rates, and had been refused.

After further discussion, an amendment to throw the committee open was lost, and the motion carried that seven members of the council should confer with Mr. Pilbrow as to the best means of carrying out the drainage scheme, and report the determination they came to on the subject to the whole council.

The meeting then separated.

The result of the above meeting was regarded by the citizens as a satisfactory termination of the long vexed question of drainage, and the local papers of last week congratulated both parties in the council—advocates and opponents of the Local Government Act—on having so agreeably come to a determination to carry out one of its important provisions. But, unhappily, this feeling has had but a brief existence, through a course subsequently adopted by that section in the local body who not only opposed the adoption of the Local Government Act, but who since its introduction have strenuously exerted themselves in opposing action being taken towards carrying out in any way either of the conditions of the Act.

On Friday a meeting of the council was called for the purpose of confirming the minutes of the General Purposes Committee, whereat the business above reported was transacted; and on the town-clerk reading the motion passed on that occasion—"That the system of drainage as proposed by the engineer, Mr. Pilbrow, be adopted, subject, however, to any modification or alteration that may be agreed upon in a conference with that gentleman and a committee of councillors; and that it be an instruction to such committee to consider the practicability of using any of the existing drains."

Mr. A. COOLEY declared that no such word as "adopted" appeared in the motion that was passed. In this opinion he was supported by Alderman Boorman and Councillors Blake, Beer, Crow, Avann, and W. J. Cooper.

The TOWN-CLERK answered that the minute was made from the written motion handed to him at the meeting, and the mayor, Aldermen Collard and Brent, and Councillors Marten, Harrison, and H. Cooper expressed themselves to the effect that the minute was literally correct.

Mr. COOLEY, however, persisted that the motion was opposed to the spirit and intention of him and others who voted for it, and moved that the whole of the minutes be not confirmed.

Mr. MARTEN said it was no use sitting there to conduct business in the manner proposed, and left the council-chamber, followed by Alderman Collard and Mr. Henry Cooper.

At the commencement of these proceedings there was a majority of the anti-local Government party present, and when the mayor put the motion, which was seconded by Mr. W. J. Cooper, no one voted against it.

The result of the non-confirmation of the minutes is that at present the drainage question remains in the same state as it did twelve months since.

From information that has been obtained by our local correspondent, we are enabled to announce that to-morrow (Wednesday) the drainage question will for the last time be placed before the council to deal with. On that day a quarterly meeting is to be held, and a proposition will be made—"That Mr. Pilbrow's plans be carried out;" and in the absence of the motion being carried, a requisition will immediately be forwarded to the Secretary of State to direct a prompt execution of a thorough and efficient system of new drainage works throughout the city.

THE MANCHESTER GAS-WORKS.

Amoungst the gas manufacturing establishments of the United Kingdom those belonging to the Manchester Corporation are probably unsurpassed, if equalled, by any other gas-works in existence, if regard be had to their magnitude, their management, the high quality and the low price of the gas supplied, and the enlightened liberality with which the large profits are applied.

In limine, as touching the points just refered to, and before adverting to the history of this great establishment, its progressive development, and the works as they at present exist, it may be mentioned that the manufacture of gas for the city of Manchester and its suburbs is conducted in two establishments, situated at a distance of about two miles from each other—the one, No. 1, at Gaythorn, near the banks of the Medlock; the other, No. 2, in Rochdale Road, upon the banks of the Irk. The works cover irregularly shaped plots of land, No. 1 being 220 yards between its widest extremities, and comprising altogether above seven acres. A great enlargement of this station is contemplated. No. 2 station is 210 yards on its largest side, with an average width of about 180 yards; the works at this station cover above thirteen acres. The workpeople employed in connexion with the manufacturing of gas number about 290 at No. 1 station, and 330 at No. 2, which is of course exclusive of the labour connected with the delivery of coal at the two stations. In connexion with the commercial part of the business there are twenty-six meter inspectors, two "broken period" inspectors, two fittings inspectors, three supernumerary inspectors, and a ledger and collecting office staff of nearly fifty men and youths, under the direction of Mr. T. Peacock, indoor superintendent. The consumers meters, through which the gas passes, are above 47,000 in number, and range in capacity from 1 to 500 lights, the largest number being of 2-light meters, of which about 26,000 are in use. Of those meters about 7500 are lent by the corporation at a rental. The mains and pipes laid by the corporation, which are, of course, exclusive of internal fittings, aggregate above 347 miles in length, and range from 2 in. to 30 in. in diameter, there being 832 yards of the largest dimension, 670¼ of various lengths of the intermediate sizes down to 208,922 yards of 2-in. pipe. The net increase of pipe laid in the last year is about 30,000 yards of various diameters.

Turning now to the production of the works, it may be mentioned that in December an average of about 25,127,000 cubic feet is turned out in the daytime, and in the twenty-four hours of the day in the same month, 158,204,000 cubic feet are transmitted from the works, their capabilities being equal to three times that quantity. The consumption of gas, as may be expected, goes on increasing from year to year, the quantity consumed last year, 1,159,868,000 cubic feet, having exceeded that of the previous year by as much as 89,628,000, or 8·37 per cent.; the number of consumers was increased 7 per cent.

The manufacturing power of the two stations is already very great, but is being gradually and greatly extended from year to year, as need requires, by enlargements and improved accommodation and processes. The marvellous increase in the consumption of gas in Manchester, and the uninterruptedly full supply of gas of a high quality at a moderate price, furnish the conclusive evidence of the fertility of resource and the ability of Mr. Macfarlane, the gas engineer to the corporation, Mr. Lyon, the manager of the No. 2 station, Mr. Leigh, chemist, and the other officers of the corporation, and of the enlightenment and business energy with which the Gas Committee and the corporation have adopted and carried out the important schemes successively submitted to them. In 1844, a year after the gas-works were transferred to the corporation, the consumption was 248 millions of cubic feet; last year it was 1160 millions; this year it is estimated that it will be at least 1300 millions. The prospective increase is expected to be in at least an equal ratio; in twenty-three years the consumption is fivefold, and in 1877 it is expected that the consumption will be tenfold what it was in 1844, or about 2500 million cubic feet. The works as at present in operation are equal, on the emergency of a succession of short dark days in winter, of making and sending out 6½ millions of cubic feet per day, and it is expected that when improvements in progress have been completed they will be equal to the manufacture of 10¼ millions of cubic feet per day. These improvements embrace the completion of the great retort-house at the No. 1 station, which is 390 ft. long by 60 ft. wide; the substitution of a spacious new retort-house for the smaller old buildings at the No. 2 station, the completion of the meters at both stations, and of the new purifier at No. 1, equal to the purification of 3 million feet per day. The new meters being provided include one at the No. 2 station, capable of passing 60,000 ft. per hour, in addition to two others of the same size already in use; and one new meter at No. 1 station, capable of passing 100,000 ft. per hour, in addition to one of the same size now in use, and two others which are capable of registering 20,000 ft. per hour each.

The gas holders—five at each of the two stations—are capable of storing 4½ millions of feet. At the No. 2 works there is existing capability to manufacture 3½ millions of feet per day, which is being increased to capability to make 5,300,000. The works at No. 1 will, when the plans which are being carried into effect are completed, have a capability nearly equal to this, or above 10 million feet per day together. The consumption of coal averages about 3000 tons per week, but in mid-winter each station consumes about 2000 tons per week. There are frequently stores of from 15,000 to 18,000 tons of cannel at each of the stations. The establishment includes an iron-foundry, in which about thirty men are employed upon castings of mains and of work for the two stations. A large stock of mains is constantly kept in store—from 8000 to 10,000 pipes, frequently of from 2 in. to 30 in. diameter, and each weighing from half a hundredweight to nearly two tons.

Doubtless the coal contracts for the supply of the Manchester Gas-Works are made without favour, and upon the most favourable terms the committee can secure. Vigilance is also exercised and ingenuity displayed in the arrangements and process of manufacture to procure gas of good quality at the lowest price, paying the fair market value for the commodities and labour

required. The retort-house at Gaythorn is a very fine and spacious erection of its kind, 390 ft. long by 60 ft. wide. Immediately adjoining it, with a floor upon the same level, and only distant a few yards from the mouths of the retorts, is the large cannel-shed, with a strong upper structure, carrying three lines of rails from a siding of the Manchester and South Junction Railway. The contents of the trucks, some laden with cannel for charging the retorts, and others with common coal for firing them, are shot from the rails above direct to the coal-store below. Notwithstanding the depth of the fall, blocks of cannel reach the floor unbroken which weigh, as we saw, in several instances, from 6 cwt. to 8 cwt. At the No. 2 station, also, money and labour are saved in the matter of coal delivery by a line of rails from the Lancashire and Yorkshire system right into the gas-work stores, where the waggons are discharged by means of a hoist, which accomplishes in five minutes what formerly took half an hour by hand labour. At No. 1 works the running of the railway to the coal-store has effected a saving of 6d. per ton for carting the cannel into the yard, and 10d. per ton for stacking it.

The buildings, apparatus, and arrangements at Gaythorn station, designed by Mr. Macfarlane, and which are being carried out under the direction of that gentleman, are, notwithstanding the disadvantages of the site, very complete in their character and most efficient in action. They furnish admirable illustrations of the practical application of science to gas engineering, and are worthy of a pilgrimage by those who are professionally interested in the subject. The yard embraces the course of the river Medlock, over which some of the most important buildings it contains are erected. On each side of the wide gateway, with its side doors opening to Medlock Street, there are large blocks of new buildings. The one contains the manager's rooms and offices, the laboratory, and other accommodation. The other block is the receiving and governor house, in which the most important operations are conducted, and which will probably be, when finished, the largest and most perfect establishment of its kind in existence. The building is erected over what was formerly the course of the river. The basement is traversed by a multitude of great mains, some leading to the meters, others from them to the governors, and passing thence into the streets to proceed to their several destinations. The governor-house has an iron floor, and is open to the roof, from which the house is lighted, having also a large half-wheel window near the roof in each end wall. The great feature in the house is the 100,000 ft. per hour meter, which is as large in itself as a moderate-sized cottage. A companion is being provided to this mammoth measurer, the two to be flanked by the comparative pigmies, one at each end of the range, which are now in use, but can only pass 20,000 ft. of gas each in the hour! The great meter has a 22-in. feed and discharge pipe, and on its front a circle of seven dial indicators, for thousands, tens of thousands, &c., and a clock. Even at noon, on the occasion of our visit, the indicator for thousands was revolving at about the speed of the seconds hand of a clock. At this time, about twelve o'clock, the pressure on the inlet to the meter was 9⅞ inches, and on the outlet 6⅞ making the working pressure of the meter 2⅞ of water. The temperature of the gas was 59 deg. Fahr. The pressure and temperature are registered every two hours night and day throughout the year, and the results tabulated.

The opposite side of the house is occupied by the range of governors for the eight mains for the services of Gloucester Street, Mosely Street, Deansgate, Chester Road, City Road, Cheadle, Oxford Road, and London Road districts. The governors are weighted with water so ingeniously supplied that they can scarcely by possibility get out of order. The mains have reciprocal by-pass valves for the supply of each other in case of any derangement. Each governor is furnished with its own clock and self-registering apparatus, which supplies a continuous record of the pressure during every hour of day and night throughout the year. For guidance in regulating the pressure the governor-house is furnished with a table of the hours at which the street-lamps are lit and extinguished throughout the year. During the shortest days, including all January and December, they are lit at 3.30 p.m., and extinguished at 6.15 a.m.; at Midsummer they are lit at 8.30, and extinguished at 1.45.

A few months ago the workmen at the Manchester Gas-Works "struck," and caused no slight consternation among the inhabitants. The committee wisely determined not to be coerced, and the men returned to work after the city had suffered a partial eclipse, which lasted for three nights. On the first night of the strike 740,000 ft. were sent out against about 2,600,000 ft., which the consumption should have been; on the second night, 964,000 ft.; on the third night, 1,981,000 ft., and on the fourth the full supply. The streets-lamps and many of the consumers were supplied during the time the men were out.

The illuminating power of the Manchester gas is equal, according to the tests which are being made daily during the current month, to 21·6 sperm candles consuming at the rate of 120 grains per hour, the consumption of the gas being reduced to a constant standard of five cubic feet per hour. Photometric observations are made daily by Mr. Leigh in the centre of the town and at one of the gas stations. It is tested daily for sulphuretted hydrogen, and is reported daily for the ordinary tests, and fortnightly for the continuous test, from its being led through a test solution. We believe that the gas is found to contain very little tarry matter or naphthaline, and that the ammonia has been reduced to the smallest possible proportion. It may here be mentioned that Mr. Leigh, in conjunction with Mr. Macfarlane, gas engineer, entertains the confident expectation that certain experiments which have been perfectly successful in the laboratory may and will be applied shortly, they hope with equal success, to all the gas passing from the works, and solve satisfactorily the important problem of separating the sulphuret of carbon from the gas—that element, as our readers are aware, being the destructive agent that tarnishes gilding and other decorations of rooms. It may here be mentioned that under the Act 23 & 24 Vict, c. 125, which regulates the supply and quality of the gas provided by the thirteen companies to the metropolis, the illuminating power is fixed as low as twelve candles. Sulphate of iron has recently been made with satisfactory results in the works.

Reference to the successive reductions in the price of gas in Manchester recalls some particulars as to the origin and development of the works. Prior to the incorporation of Manchester the town was governed by police commissioners, whose sole and simple qualification for office was their payment of a rental of £30 per annum. The commissioners wisely established gas-works about 1821, the first Act having been obtained in 1824, and obviated the evils supposed to be incident to a joint-stock company monopoly. The profits have been, from the first establishment of the works, devoted in certain proportions to the payment of interest on money borrowed for their construction, to the gradual extinction of the mortgage debt, and to the public improvements of the town. About 1828 the price of gas to consumers was 14s. per 1000 cubic feet, reduced from 14s. 6d. Scarcely one-fourth of the ratepayers were at that time consumers of gas, as the large spinning establishments made their own; the cost of the street-lamps had thus to be borne by comparatively few consumers, who paid this excessive price, while the owners of the great factories paid nothing for public lighting. The unequal incidence of this street-lamp tax led to a large increase in the number of commissioners, at one time about 1800 in number, and to a serious riot at a town's meeting on the gas question. Ultimately, after the incorporation of Manchester, the management of the gas-works passed into the hands of the City Council, which, in 1843, appointed a committee of fourteen of its number to manage the affairs of the works, by whom and their successors they have since been conducted. The initiatory action in the management is taken by sub-committees, assisted by the engineer, managers, and other officers. The recommendations of the sub-committees are discussed, modified, rejected, or adopted by the general committee, and ultimately submitted to the City Council for ratification.

Since 1828 a succession of reductions have taken place until now, when the price, according to the last official report, is 3s. 2d. per 1000 ft. Here again, for the purpose of comparison, it may be mentioned, bearing in mind that the Manchester gas is all made from cannel coal, that it is of 21·6 sperm candles illuminating power, occasionally considerably higher, and sold at 3s. 2d. per 1000 ft.; that, in the select Committee of the House of Commons on the London gas bills, which sat last session, Sir John Trollope, the chairman, proposed that the London companies should be required to increase the minimum power to fourteen sperm candles, six to the pound, that the maximum price should be reduced to 4s. per 1000 ft. for common gas, and 6s. for cannel gas of twenty candles. He also proposed to report that since the passing of the Act before quoted the price of gas to London consumers had been increased, while the quality had become worse. As regards prices of gas, it may not be out of place to refer here to the charges of some of the London companies. The Chartered Gas Company charges 4s. 6d. and 6s. per 1000 ft.; the City of London, 4s. common, and 5s. 6d. cannel; the Commercial, 4s.; the Crystal Palace District, 3s. 8d. to 4s. 8d.; the Equitable, 6s. and 5s. 6d. cannel, and 4s. 6d. and 4s. common; the Central, 4s. 6d.; the Imperial, 4s. 6d. maximum to 30th of June; and 4s. from 30th of June, the Independent, 3s. 4d. to 4s.; the London, 4s. 6d. to 5s. common, and 6s. cannel; the Phœnix, 4s. town, and 4s. 3d. country; the South Metropolitan, 3s. 4d. and 3s. 8d.; the Surrey, 4s. 6d.; the United General, 4s. 9d.; the Victoria Docks, 3s. 6d. to 5s.; the Wandsworth and Putney, 5s.; and the Woolwich (two compaines), 4s. 6d.

The capital of the gas-works of Manchester amounts to £547,854, made up of £347,472 borrowed money owing, and £200,382 excess of assets. Last year the gross profits amounted to £52,553, which were thus appropriated:—Payment of interest, £13,252; liquidation of mortgage debt, £19,784; improvement purposes, £19,516. In the same year £13,317 was charged to revenue in respect of depreciation of works and mains. In the course of the last seven years £125,408, has been paid out of profits in liquidation of mortgage debt, and £129,220 has been expended in public improvements. In the same seven years revenue has been charged £80,776, for depreciation of works and mains.—*The Engineer.*

The Gas-Meter Company, Limited.—This company, who have works in London, Dublin, and Oldham, and of which A. A. Croll, Esq., is chairman, have just declared their usual interim dividend at the rate of 12 per cent. per annum for the half year ending the 31st of December last.

Baker's Patent Anti-Incrustator.—We lately had an opportunity, which we embraced, of inspecting, at the South Metropolitan Gas-Works, a Cornish boiler which is provided with one of Baker's patent anti-incrustators. Most of our readers are doubtless acquainted with the construction of the apparatus. It is simply a starshaped piece of brass with copper points, which is fixed in the steam-chest, but insulated from it by means of a piece of porcelain; a wire is attached to the apparatus, and conducted to the remote end of the boiler, passing through an insulator at the foot of the steam-chest. What the anti-incrustator is, and what it does, we can speak confidently about in the case to which we have above alluded, but how it does it we shall not now attempt to explain: to say it operates under the influence of magnetism or electricity is a vague definition, and about as intelligible as the principles of astrology. The fact is, that the boiler in question was partly cleaned about seven weeks since, the scale having to be removed by means of a hammer and chisel. The anti-incrustator was then applied, and when the boiler was opened, after six weeks work, the scale which was left untouched at the previous opening was so loosened that it fell off in sheets at a slight touch, whilst the cleaned part remained so, and the solid matter deposited after the instrument had been applied was thrown down in the form of power, which is readily blown off. We saw thick pieces of scale disengaged from different parts of the flue by a mere tough of the fingers, the result of loosening caused by the anti-incrustator. The instrument appears to answer its purpose well, and will doubtless soon be more extensively employed.—*The Engineer.*

Alleged Pollution of Wells by the Slough Gas Company.—An information laid by Dr. Cooper, the medical officer of the Great Western Railway, against the Slough Gas and Coke Company, Limited, for the pollution of the wells of the town, was to have been heard at the Petty Sessions on Saturday week, but was, we believe by mutual consent, adjourned till the 20th of May.

The Gas Question in Londonderry.—Mr. Cotton, corporation inspector of public lighting in the city of Dublin, who was lately appointed by the joint committee of the gas consumers and gas company in this city, to investigate the question in dispute between the inhabitants and the gas company, has for the last few days been conducting a series of experiments at our local gas-works, with the view of testing the quality and illuminating power of the gas supplied to the consumers in town. The inhabitants generally were invited to witness the experiments which Mr. Cotton made by means of a "photometer," and chemical apparatus; and on Wednesday and Thursday evening se'nnight, and the forenoon of the next day, a number of gentlemen were present, and expressed their entire satisfaction with the chemical analysis of the gas. Mr. Cotton has a happy method of proving clearly to the uninitiated the way in which gas can be economized, and the light greatly improved. We had the pleasure of witnessing some of these interesting experiments; and we feel satisfied that, when Mr. Cotton makes his report, the cause of the late heavy consumption, and consequent increase of charge, will be fully explained and accounted for. We may mention one alteration which will be recommended by Mr. Cotton, in his report, with regard to the street-lamps. The illuminating power may be increased four times, by adopting a different "burner" from that at present in use, and attaching a "governor" to each lamp—the same as issued in the city of Dublin—without any increase in pressure or additional consumption of gas. Mr. Cotton speaks in the highest terms of the con-

struction and general arrangements of our new gas-works, and it must be gratifying to the company and the public generally to have the assurance of a gentleman of Mr. Cotton's great experience that they are second to none in the kingdom for general efficiency. Mr. Cotton also acknowledges the willingness of the gas company to afford every facility for the fullest investigation of the question at issue between the company and the public. His report will be published shortly, and we are confident that it will be satisfactory to all the parties concerned. It must be gratifying to Mr. Ridley, the efficient manager of our model gas-works, which have been entirely constructed from plans prepared by him, to find a gentleman of Mr. Cotton's ability and qualifications pronouncing so high a eulogium upon the works now carried out—namely, that their projector must be a man of rare ability.

SALE OF THE WOLVERHAMPTON WATER-WORKS TO THE CORPORATION.—The corporation of Wolverhampton have become the purchasers of the New Water-Works Company of that town. The company was formed chiefly by Manchester capitalists, and Mr. Moon, chairman of the London and North-Western Railway Company, with Mr. Bancroft, another director, have been the chief directors for some time past. When the company was started they purchased the works of a company previously in existence in Wolverhampton, who was unable to furnish more than a partial supply, but during the greater portion of the seven years the new company has been in existence an abundant quantity of water has been forthcoming, obtained chiefly from a watercourse, and also from sinking into the rock at Tettenhall, at an elevation sufficiently high to force it to the highest parts of Wolverhampton, and Wolverhampton is much higher than Birmingham. The company has been for some time past supplying, not only Wolverhampton, but also Bilston and Willenhall, and one or two other places in the parliamentary borough of Wolverhampton, out of which place the South Staffordshire Water-Works Company have been kept by virtue of an arrangement which required the payment from the Wolverhampton Company of a sum of £400 per annum. The corporation of Wolverhampton have had the right of purchasing the works of the water company to the exclusion of any other customer, and the directors of the water company having come to the conclusion that the corporation ought now either to avail themselves of their priority or else abandon it, lodged a bill requiring the corporation to purchase within a year. Upon this, the corporation and the company commenced negotiations, with a view on the part of the former to purchase, for they were not prepared to fight the company, with no beneficial prospect in view. Ultimately it was arranged that the works should pass into the hands of the corporation upon the corporation agreeing to pay the company's liabilities, upon the following terms—viz., 1868, 2¼ per cent.; 1869, 2½ per cent.; 1870, 3 per cent.; 1871, 3½ per cent.; 1872, 4 per cent.; and thenceforward 4 per cent. in perpetuity upon the ordinary share capital of the company, but without capitalizing; and the foregoing payments to be made subject to the debenture debts, and also to the preference stock of the company. The balance-sheet of the company for 1866 was to be the basis of the arrangements. It should be stated that the company at their last division showed that they had earned enough, after paying all the liabilities of the year, to divide a net 2½ per cent., which is the highest dividend that has been paid. The concern also showed an increased revenue from new customers of £500 a year, and more than this progressive increase is confidently expected with the lapse of time; so that although the purchase involves a liability of payment of £200,000, the transaction, it is believed, will prove in every way beneficial to the town.

Share List of Metropolitan Gas Companies.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
8000	10	Anglo-Romano . .	10 0 0	9 0 0	11 to 12
5000	20	Bahia (Limited) . .	20 0 0	4 0 0	16 10 0
1000	20	Do., preference .	20 0 0	10 0 0	27 10 0
750	20	Do., do., redeem.	10 0 0	10 0 0	12 10 0
30000	5	Bombay (Limited).	5 0 0	£5 intr.	4 to 4½
10000	5	Do., third issue .	4 0 0	£5 intr.	3 to 3½
10000	20	British, Limited (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge, & Holywell.)	20 0 0	10 0 0	27½ to 28½
12000	50	*Chartered*	50 0 0	8 10 0	52 to 52½
6000	50	Do.	35 0 0	8 10 0	36 to 37
10000	20	*City of London*, A shares	20 0 0	8 0 0	23 to 25
10000	10	Do., B shares	10 0 0	4 0 0	6½ to 7
8000	10	Do., new shares.	10 0 0	8 0 0	11½ to 12½
25000	25	City of Moscow (L)	25 0 0	£7 intr.	15 to 16
17490	25	*Commercial* . . .	25 0 0	10 0 0	32 to 34
2500	20	Continental Union.	20 0 0	8 0 0	14 to 15
17500	20	Do.	15 0 0	8 0 0	9 to 10
10000	20	Do., preference .	20 0 0	7 0 0	
5827	5	County & Gen. (L)	5 0 0	nil.	
2000	5	Do., preference . (Pater, Pembroke, Ely, Lea Bridge, Northfleet, Walton, & Ware.)	5 0 0	nil.	
5000	10	*Crystal Pal. Dist.*	10 0 0	10 0 0	13 to 14
5000	10	Do., preference .	10 0 0	6 0 0	12½ to 13
10000	10	Do.	2 10 0	7 0 0	2½ to 3

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
4000	50	*Equitable*	50 0 0	10 0 0	66 to 68
4000	25	Do., new shares.	25 0 0	10 0 0	33 to 34
23406	10	European (Lim.) .	10 0 0	10 0 0	13 to 13½
12000	10	Do., new shares.	5 0 0	10 0 0	6½ to 6½
		Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)			
20000	10	*Gt. Cent. Gaz Cons.*	10 0 0	10 0 0	12½ to 13
5000	10	Hong Kong (Lim.)	10 0 0		8 to 10
26000	50	*Imperial*, old sh.	50 0 0	10 0 0	65 to 66
1300	100	Do., bonds . . .	£100	10 0 0	175 to 180
2391	25	Imperial Austrian.	25 0 0		
28000	50	*Impl. Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwp., Bordeaux, Brussels, Cologne, Frankfort-on-M., Haarlem, Stolberg, Toulouse, & Vienna	43 15 0	16 0 0	94 to 95
400	100	Impl. Mexican (L.)	75 0 0		
3000	40	*Independent* . . .	40 0 0	10 0 0	53 to 56
3000	10	Do.	10 0 0	5 0 0	7 to 9
3000	20	Do.	12 10 0	7 10 0	13 to 14
7133	50	*London*	50 0 0	10 0 0	60 to 61
5610	25	Do., 1st pref. .	25 0 0	6 0 0	25 to 27
503	50	Do., 2nd pref. .	50 0 0	6 0 0	
214	50	Do., 3rd pref. .	50 0 0	6 0 0	
18781 *l*		Do., 1st pref. sk		6 0 0	
11828 *l*		Do., 2nd pref. sk		5 0 0	

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
12000	5	Malta & Medit. (L.)	5 0 0	3 0 0	3¼ to 4
6000	5	Do., preference .	4 0 0	7 0 0	4 0 0
30000	5	Oriental, Calcutta	5 0 0	8 10 0	5½ to 5¾
30000	5	Do., new shares.	1 0 0	8 10 0	1 to 1½
10000	5	Ottoman (Limited)	5 0 0		1¼ to 2½
10000	10	Pará (Limited) . .	10 0 0	6 0 0	9½ to 9½
27000	20	*Phœnix*	20 0 0	10 0 0	25 to 26
3600	100	Do., new	25 0 0	7 10 0	24 to 25
144000	8*s.*	Do.	100 0 0	5 0 0	72 to 74
5000	20	*Ratcliff*	20 0 0	10 0 0	22 to 24
	20	Rio de Janeiro (L).	20 0 0	10 0 0	21 to 22
6959	5	Singapore (Lim.) .	5 0 0	3 10 0	
2000	5	Do., preference . Shanghai	5 0 0	7 10 0	
4800	50	*Sth. Metropolitan*	50 0 0	10 0 0	70 to 72
15000	10	*Surrey Consumers*	10 0 0	9 0 0	13 to 13¼
10000	10	Do., new	5 0 0	9 0 0	7 to 7¼
9000	4	United General . . (Limerick)	4 0 0		
10000	10	*Victoria Docks* . .	5 0 0	6 0 0	
3000	10	*Wandsworth & Putney*	10 0 0	7 10 0	13½ to 14
20000	10	Western (L.) A sh.	10 0 0	10 0 0	13½ to 14
10000	10	Do., B shares.	5 0 0	10 0 0	6½ to 7
10000	10	Do., C shares.	4 0 0	10 0 0	5½ to 6
20000	10	Do., D shares.	1 0 0	10 0 0	1½ to 2
8000	5	*West Ham*	5 0 0	7 10 0	6 10 0
6000	5	Do., new shares.	3 0 0	7 10 0	3 18 0
551	10	West London Junction (Lim.) .	10 0 0	6 0 0	
520	10	Do., preference .	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	3 15 0	2 13 0	2 12 6	3 10 0	3 10 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2¾ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¼ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nippies	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 3-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

East Castle, Haswells, Nettlesworth Primrose, and South Pelaw	7*s.* 6*d.*
Felling, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	7 9
Burnhope, Craghead, Charlaw, Derwent, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	8 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	8 3
Brancepeth, Dean's Primrose, New Pelton, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	8 6
Ramsay's Newcastle Cannel	20 0
Wigan Cannel (at Liverpool)	17 0
Scotch Cannel:—	
Boghead (at Leith)	55 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Cowdenbeath	12 0
Lesmahago (at Glasgow)	32 6
Ditto (at Granton)	30 0
Arniston	27 6
Wemyss	20 0
Haywood, Wilsontown (at Granton)	23 0
Pirnie	15 0
Lothian's Cannel (at Leith)	28 0
Myles' Cannel	23 6

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

Chatham and Rochester	5*s.* 6*d*
Cork	9*s.* to 9 6
Dover, Folkestne, & Ramsgate	6 6
Dublin	9*s.* 6*d.* to 10 0
Exeter Quay	8 6
Ipswich	5 0
London (from Leith)	8 0
London (Pool)	6 0
Lowestoft and Yarmouth	4 9
Portsmouth & Southampton	7 0
Plymouth	7 9
Shoreham	6 6
Whitstable	5 6
Weymouth	7 6
Foreign.—Per Keel:—	
Barcelona	£20 0
Bordeaux	13 0
Boulogne and Calais	6 15
Cadiz	12 0
Cronstadt	9 0
Copenhagen	7 10
Genoa	19 0
Hamburg	7 15
Havre de Grace	9 10
Leghorn	19 0
Lisbon	12 0
Rotterdam	£7 to 7 5
Stettin	9 5
Trieste	19 0
Venice	22 0

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2. 10*s.* to	£3 15 0
Cliff's Fire-bks. (at Wortley), p. 1000.	2 15 0
Ingham's ditto (at Wortley), p. 1000.	2 15 0
Fire-clay Retorts, p. ft. run, 5*s.* 6*d.* to	0 7 0
Tough Cake Copper, p. ton	80 0 0
English Pig Lead, p. ton	19 17 6
Welsh Bar Iron (in London), p. ton	6 10 0
Foreign Spelter, p. ton	21 10 0
English Block Tin, p. ton	89 0 0
Banca, p. ton	88 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

JOHN VICKARY,

GAS ENGINEER AND CONTRACTOR, IRON AND BRASS FOUNDER,

WORKS—EXE ISLAND, EXETER,

Tenders his best thanks to the various Gas Companies in **England, Ireland, and Wales,** for the very liberal and kind support he has received for the last **22 years,** during which period he has erected and extended above **200 Gas-Works.**

In addition to the numerous towns wherein he has been engaged, he begs reference to the following testimonial:—

Plymouth and Stonehouse Gaslight and Coke Company.

Sir,—I have much pleasure in testifying that the 100-foot Telescope Gasholder and Cast-Iron Tank, erected by you for this Company in 1862, has given the highest satisfaction, and never required the slightest attention or adjustment since its completion.

(Signed) PETER ADAMS, Chairman.

He has also erected a 100-foot Gasholder and Cast-Iron Tank at **Exeter;** an 80-foot Telescope Gasholder and Iron Tank at **Devonport;** a 90-foot at **Torquay,** &c. &c. At either of those works satisfactory references can be made.

He also begs particular attention to his **Improved Gas-Meters,** either **Wet, Dry, or Compensating,** the materials and workmanship of which guaranteed of the very best description, and which has gained for his Meters so excellent a reputation for these last **20 years.**

RETORTS, DIP & ASCENSION PIPES, HYDRAULIC MAIN, CONDENSERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, and GASHOLDERS,

Of any size, and every description of article required in Gas-Works.

Mains, Tees, Connexions, and Syphons, from 2 to 12 in., always in stock, and supplied at Scotch prices.
Clay Retorts and Fire-Goods of every description.
Gas-Fittings of the most modern designs.
Iron Pipe and Fittings, Service Cocks, &c.
Plans, Specifications, and Estimate for the erection of New Gas-Works of any size furnished.

WILLIAM & BENJAMIN COWAN,

(ESTABLISHED 1827,)

WET AND DRY

GAS-METER MANUFACTURERS,

BUCCLEUCH STREET WORKS, EDINBURGH.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

C. & W. WALKER,

Manufacture and Erect GASHOLDERS, TANKS, BOILERS, CONDENSERS, SCRUBBERS, and IRON ROOFS of any magnitude. They also invite special attention to their

GAS-VALVES OF EVERY KIND & DESCRIPTION;

IMPROVED ECONOMICAL SYSTEM OF PURIFIERS, with DRY CENTRE-VALVES AND SIMPLE CONNEXIONS;

WOOD PURIFIER GRIDS.

MIDLAND IRON-WORKS, DONNINGTON, NEWPORT, SHROPSHIRE.

CLERK, COLLECTOR, OR INSPECTOR.

WANTED, by a young Man, aged 23 (married), a SITUATION in either of the above capacities. Several years experience in a Gas-Work. Good references.

Address, stating particulars, O. P., Post-Office, WINCHESTER.

WANTED, by the Sherborne Gas Company, a steady Man who understands the erection of fittings, the laying of mains and services, and of smith's work in general, and thoroughly accustomed to the routine of gas work. Character from last employer required. Liberal wages will be given to a competent man.

Apply, with testimonials, to T. W. R. WHITE, Manager and Secretary.

April 26, 1867.

TO GAS COMPANIES.

WANTED, a Situation as Manager of a Gas-Work, by a married Man, aged 33. Practically acquainted with the manufacture of gas, setting clay or iron retorts, laying mains or service-pipes, and can repair meters; also a good gas-fitter. Satisfactory references from past and present employers.

Address W. D., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS COMPANIES.

WANTED, by a person of experience, an Appointment as Manager, Collector, or Inspector. The advertiser is well acquainted with, and has fulfilled for 25 years, the duties of the several positions, and can give good reference.

J. R. T., 88, Lorrimore Road, Walworth, LONDON, S.

A Gas Engineer of great experience, both at home and abroad, is now disengaged, and offers his services to gas companies and the profession generally. He would furnish designs, plans, and estimates for new works, would contract for the alterations and extensions of existing ones, and report on the condition of Gas-Works either in England or the Continent.

Address "ENGINEER," Mr. King, 11, Bolt Court, FLEET STREET, E.C.

LISBURN GAS-WORKS.

WANTED, on the 1st of July next, a MANAGER for the above work. He will be required, besides taking the general management of the works under the Chairman and Directors, to keep the accounts and take the indication of the meters, but not to collect the gas-rents. He must be competent to superintend alterations and additions to the works when needed.

Security to the amount of £200 will be required for the due discharge of the duties of the situation.

Salary £100 a year, with a residence, office houses, and gardens.

Applications, with testimonials as to character, ability, and experience, to be forwarded to "The Chairman of the Lisburn Gaslight Company, Limited," before the 1st of May next.

Lisburn, Co. Antrim, Ireland,
March 1, 1867.

TO GAS COMPANIES.

WANTED, by a young Man, a Situation as TINMAN, who thoroughly understands the repairing of meters. Good references if required.

Address T. H., 16, Wilson Street, Gray's Inn Road, LONDON, W.C.

WANTED, by the Advertiser, age 23 years, a Situation either as MANAGER of a small gas-work, or as ASSISTANT in a large work. Has a thoroughly practical knowledge of gas work. Is a good accountant and a fair draughtsman, and can give first-class testimonials.

For further particulars, address J. S. C., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a respectable young Man, a SITUATION in a Gas-Work. Thoroughly understands gas-fitting, meters, service and main laying, and manufacture of gas. Good character.

Apply to Mr. H. A. ANDERSON, Gas-Works, Berkhempstead, HERTS.

FOR SALE, a 30,000 feet per hour BEALE'S EXHAUSTER, with 8-in. Walkers' valves.

A 12-in. PARKINSON'S STATION-GOVERNOR.

Both in excellent order, and sold in consequence of larger being substituted.

Application to be made to the MANAGER of the Leicester Gas-Works.

TO CONTRACTORS & OTHERS.

FOR SALE, at the Gas-Works, Horsham, SUSSEX, a BOX CONDENSER, fitted with nearly 100 ft. of 4½ pipe. Also a quantity of other materials and fittings, chiefly 4 in. A considerable portion of the above has been in use but a short time, and is removed in consequence of the works being enlarged. Price, on the rail, £5 per ton.

GAS OF HIGH ILLUMINATING POWER.

THE Trinidad Petroleum Company, Limited, will supply samples of their Trinidad PITCH for gas purposes of 1 lb. each free of charge, or samples of 1 ton or upwards at 45s. per ton, delivered on to the railway at Silvertown, on application being made to their SECRETARY, at the Offices of the Company, 110, CANNON STREET, E.C.

TO CONTRACTORS.

THE Directors of the Farnham Gas Company are prepared to receive TENDERS for a GASHOLDER and BRICK TANK, Condenser, Scrubber, Station-Meter, Governor, Meter-House, Valves, Mains, &c. The Brickwork to be a separate tender from the Ironwork.

Plans and specifications may be seen on and after the 1st of May, at the Company's Office, 112, West Street, Farnham, SURREY; or a complete set of tracings, with specifications, will be forwarded by Mr. WELLS, Secretary, on receipt of 15s., to whom tenders may be sent in not later than Tuesday, the 14th of May, 1867, endorsed "Tenders."

The Directors do not bind themselves to accept the lowest or any tender.

CONTRACT FOR GAS COALS.

TOWN OF DUDLEY GASLIGHT COMPANY.

THE Directors of the above Company invite TENDERS for the supply of 7000 tons of Screened GAS COAL, as free from sulphur as possible; also 1000 tons of CANNEL COAL. The weight to be 2400 lbs. to the ton, to be delivered in trucks free at Netherton Station, Great Western Railway, between July 1 next and June 30, 1868. Rates of delivery subject to arrangement. A trial will be made previous to selection.

Terms of payment—monthly, in cash.

Tenders to be addressed to the SECRETARY, and endorsed "Tender for Gas Coal," on or before the 14th of May next.

The Directors do not bind themselves to accept the lowest or any tender.

Gas-Works, Dudley, April 17, 1867.

HALIFAX CORPORATION GAS-WORKS.

THE Gas-Works Committee are pre- pared to receive TENDERS for the construction and completion of TWO SCRUBBER CONDENSERS for the Halifax Gas-Works.

The drawings may be seen, and copies of the specification and form of tender obtained, on payment of 5s., on application to Mr. G. D. MALAM, Engineer of the Gas-Works; and tenders, endorsed "Tender for Scrubber Condensers," must be sent to me on or before Thursday, the 23rd of May, 1867.

By order,
J. E. NORRIS, Town-Clerk.

Town Hall, Halifax, April 27, 1867.

SAMUEL CUTLER & SON,

CONTRACTING GAS ENGINEERS, &c.,

MANUFACTURERS OF GASHOLDERS, TANKS, PURIFIERS,

AND ALL DESCRIPTIONS OF GAS-MAKING APPARATUS.

Iron Roofs, and General Iron Work. Mains Supplied and Laid.

S. C. & SON supply every requirement for a Gas-Work, and keep in stock Retort Lids, Costers, Barrows, Scoops, Bolts and Nuts, &c. &c.

PROVIDENCE IRON-WORKS, MILLWALL, LONDON, E.

E. J. & J. PEARSON,

DELPH & TINTAM ABBEY FIRE-CLAY & BRICK-WORKS,

STOURBRIDGE,

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY;

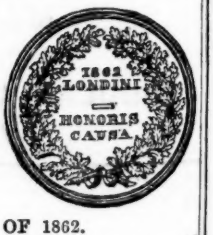
MANUFACTURERS OF

GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

EDWARD COCKEY & SONS,

IRON-WORKS, FROME SELWOOD,

PATENT GAS-VALVES.



A PRIZE MEDAL

WAS AWARDED TO THE PATENTEES AT THE INTERNATIONAL EXHIBITION OF 1862.

These Valves are formed of two cylinders, working one on the other horizontally, having their faces ground perfectly gas-tight.

They are adapted either as central valves, for two, three, or four purifiers—as bye-passes—or as inlet and outlet-valves for gasholders.

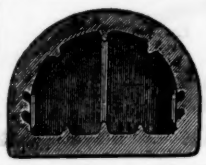
They have been fixed in some of the most important Gas-Works in the Kingdom, for more than eight years. Considerably over two hundred of them are now in use, and the most satisfactory reports of their advantages continue to be received. They are simple in construction, and not liable to get out of repair, and if in course of time the faces should leak, they can be easily re-ground and made as tight as ever, without removal from their positions. Each Valve is fitted with an index, which shows to the person in charge of the Works in what direction the gas is passing.

Frome, January 20, 1866.

FRASER'S PATENT RETORTS.

THE RIBBED IRON RETORTS

Have now been in use about three years, and continue to give satisfaction. The



PATENT CLAY RETORTS

Will work off the Gas from the Coal in less time, and Carbon does not form in them so freely, nor adhere so firmly, as to Plain Retorts.

Further particulars and prices on application to Mr. A. C. Fraser, Engineer to the Gas Company, Colchester.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gasfittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gasfittings and Gas Apparatus.

MARTIN'S

LEE MOOR PORCELAIN FIRE-BRICKS,

Containing no Lime, and only ·45 of Oxides, resist the strongest heats, and will last for Gas-Works longer than any others.

Samples and prices sent, and the highest references given, on application to

MARTIN BROTHERS,

ST. AUSTELL, CORNWALL.

WALTER FORD,

159, GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

JOSEPH BOULTON,

80, KING'S CROSS ROAD, AND

104, GREAT PERCY STREET, CLERKENWELL.

Manufacturer of the Patent Dry and Improved Unvarying Water-Line Gas-Meters and Station-Meters, Governors, Experimental Meters, and Pressure Gauges, on the most improved principle.

Old Meters thoroughly repaired, and altered to meet the requirements of the Act of Parliament.

ALL METERS WARRANTED.

PATENT ECONOMIZERS,

ADAMAS-POINTED,

Union Economizer, 1-10th real size of Flame.

Bat's-wing Economizer, 1-10th real size of Flame.

Ensure a large, well-shaped, steady flame. The aperture never wears out, thus attaining uniformity of consumption, great brilliancy of light, freedom from roaring, flickering, or waste of Gas, and no smell of sulphur. One gives more light than a triple-branch ordinary burner.

At the Expense of not quite One Penny for full five hours, a most cheerful light is obtained, surpassing the illuminating power of Twelve best Sperm Wax Lights.

The combustion is perfect; there is no escape of carbonic acid, carbon (or Soot), to discolour the ceiling, or injure the furniture.

All sizes kept in stock, suitable for cannel, mixed, and common gas, plug or taper screwed, to take the place of any old burner.

TESTIMONIAL.

Gas-Works, Portsea, January 2, 1867.

Dear Sirs,—I cordially respond to your invitation to give my opinion of your "Economizer." We have now not less than 8000 in use, all of No. 8 size, bat's-wing and fish-tails; and in no single instance have they failed to give a brilliant light, well-formed, and unaltered from day to day, with a miuimum consumption of gas. Every gas engineer, who has had to struggle with the complaints of his customers, knowing them to arise solely from imperfect combustion of the gas for light-giving purposes, should introduce these burners, and he will find what I have found, universal satisfaction, in place of a great deal of discontent. On the other hand, the consumer will find it to his advantage to CONSUME his gas through this burner, as he will really get the value of what he is paying for. I can affirm with perfect confidence that this Company's consumers who now use this burner would not part with it if it cost six times as much.—I am, dear sirs, yours very truly,

J. Douglas, Superintendent and Secretary, Portsea Island Gaslight Company.

Messrs. Lambert Brothers, Walsall.

LAMBERT BROTHERS, Tube Mills, Gas-Fitting Manufactory,

WALSALL.

Agents supplied with Show-Cards and Tables of Consumption.

TENDERS FOR GAS TAR.

THE Directors of the Hornsey Gas Company are desirous of receiving TENDERS for 6000 gallons (more or less) of TAR, now at their works at Hornsey, Middlesex, on the line of the Great Northern Railway. Tenders to be at per 100 gallons. The Contractor to find casks, and when filled to take them away at his own expense.

Tenders to be sent in on or before the 14th of May next, addressed to Edwd. B. Bennett, Secretary, 37, Cursitor Street, E.C.

April 18, 1867.

TOWN COMMISSIONERS OFFICE, BANDON.

THE Town Commissioners of Bandon will at their Meeting, to be held on Monday, the 6th of May next, proceed to appoint a MANAGER of the Gas-Works. The person elected must be competent to manufacture gas, put up gas-fittings, lay mains, take meters, set retorts, and perform all other duties appertaining to the office.

Applications, accompanied by testimonials, will be received by me on or before the above day.

By order,

S. R. Tresihan, Clerk to Commissioners.

Bandon, April 4, 1867.

TENDERS are Wanted by the Directors of the Aldershot Gas and Water Company, for the PURCHASE of the almost new manufacturing plant of a small Gas-Work, capable of making 3,000,000 feet annually.

A preference will be given to any one taking the whole, which can be seen by applying at the Office, Bank Street, ALDERSHOT.

FOR SALE, a set of 4 Cast-Iron Dry-Lime PURIFIERS, 10 ft. square and 3 ft. 6 in. deep inside, together with hydraulic centre-valve for 10-in. connexions, and 2 sets of cast-iron girders, 46 ft. 3 in. long, with lifting crabs.

Also a 30,000 feet per hour BEALE'S EXHAUSTER, with 8-in. Walkers' valves.

A 12-in. PARKINSON'S STATION-GOVERNOR.

All in excellent order, and sold in consequence of larger being substituted.

Application to be made to the Manager of the Leicester Gas-Works.

BODMIN GAS CONSUMERS COMPANY,

LIMITED.

GASHOLDER.

TENDERS are requested for en- larging one of the GASHOLDERS at the works of the Bodmin Gas Company.

Full particulars may be obtained, and a specification of the work required may be seen, on application to Mr. James Thomas, the Manager at the Works, or to the undersigned, to whom sealed tenders, stating the lowest price for which the work will be done, must be sent before the 1st of May next.

By order of the Directors,

Preston Wallis, Secretary.

N.B.—The Directors do not bind themselves to accept the lowest or any tender.

Dated Bodmin, March 22, 1867.

BALANCE-SHEETS AND REVENUE ACCOUNTS

A FIRM of Accountants, much engaged in the preparation of Gas Companies Accounts, are open to contract for the keeping, balancing, or auditing the books of other Companies, which, from their experience, they are enabled to do on moderate terms.

Address, Sandell & Maddrs, Accountants, 4, Skinner's Place, Size Lane, London, E.C.

NATURAL

HYDRATED OXIDE of IRON constantly on Sale. Apply to

MARTYN DENNIS AND CO.,

LIVERPOOL.

LEONI'S Patent Adamas GAS-BURNERS are entirely free from liability to Corrosion, Injury from Heat, or danger of Fraction, and are *unalterable* in the dimensions of their Apertures. Uniformity in the consumption of gas is obtained by the process of manufacture, which insures that the burners shall be precisely similar in pattern.

Net Cash Price, 8s. per gross.

Patentee and Sole Manufacturer, S. Leoni, 34, St. Paul Street, New North Road, London, N.

EDMUND SMITH,

GRASBROOK, HAMBURG,

would respectfully call the attention of engineers and managers of gas-works to his Newly Improved GAS-METER, patented 1862 in England, and the principal parts of the Continent.

Price-lists and tenders for gas-meters, experimental station-meters, experimental holders, governors, purifiers, gasholders, pressure-gauges, gas and water fittings, &c., are forwarded on application.

THE

GAS-METER COMPANY, LIMITED,

A. ANGUS CROLL, C.E., Chairman.

GEORGE RAIT, MANAGING DIRECTOR. T. G. BARLOW, C.E., CONSULTING ENGINEER.

CROLL'S DRY GAS-METER,

(Invented and Patented in 1844, since which time 200,000 of these Meters have been manufactured by Mr. CROLL,)

Obtained **PRIZE MEDALS** at the EXHIBITIONS of London, 1851, of New York, 1853, and Paris, 1855.

IMPROVED in 1858,

And was awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for

"GOOD CONSTRUCTION and SOUND WORKMANSHIP."

Now manufactured by the GAS-METER COMPANY, LIMITED, KINGSLAND ROAD, LONDON; and, for the purpose of obtaining greater accuracy in all its parts, the most perfect machinery has been adopted, "By which the construction of the Meter is much simplified, while its liability to get out of order is diminished." (See report of T. G. BARLOW, Esq., C.E.)

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS,

PLAIN, GALVANIZED, & ENAMELLED, for Gas, Steam, and Water, from ⅛ in. to 6 in. bore.

STOCKS, TAPS, and DIES, GUN METAL GLAND-COCKS, WATER-GAUGES, &c.

PATENT LAP-WELDED IRON TUBES

For Locomotive and Marine Boilers, &c.

LONDON WAREHOUSE—No 66, QUEEN STREET, E.C.

1862.

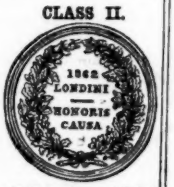
PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

CLASS II.



This Paint having been in general use over four years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (28s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs under 20s. per cwt., as compared with White Lead at 28s. per cwt.

ORLANDO BROTHERS'

SELF-ACTING DISTRICT GOVERNOR.

Prices, according to size, can be obtained upon application to

Mr. WILLIAM ARCHER,

METER COMPANY'S WORKS, OLDHAM.

KROMSCHROEDER AND CO.,

GAS ENGINEERS,

PATENTEES AND MANUFACTURERS OF

WET AND DRY GAS-METERS.

IMPERIAL METER-WORKS,

KING'S ROAD, CAMDEN TOWN,

LONDON, N.W.

KIRKWOOD CANNEL COAL.

This Coal is largely used in the Gas-Works at Glasgow, Paisley, Port Glasgow, Edinburgh, Leith, and many other towns throughout Scotland. It yields 10,648 cubic feet per ton; illuminating power, 27·55 standard candles; coke per ton, 9 cwt. 83 lbs. Railway communication from the pits (at Coatbridge) to all parts of the country; ports of shipment in Firths of Forth or Clyde.

For quotations, &c., apply to Mr. JOHN MACDONALD, 68, St. Vincent Street, GLASGOW.

FIRE-CLAY GAS-RETORTS, &c., CANNEL AND STEAM COALS.

WILLIAM FRASER, Inverkeithing

(owner of the Works at which Fire-clay Retorts were first made), having greatly enlarged his works, can supply retorts and other fire-clay goods to any extent.

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WILLIAM FRASER ships COWDENBEATH PARROT COALS at Charlestown and Burntisland at 11s. per ton; and HALBEATH STEAM COALS, on Navy List, at 8s. 6d. per ton.

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AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water-Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

OXIDE OF IRON,

We are prepared to supply, on moderate terms,

HYDRATED PEROXIDE OF IRON (BOG OCHRE),

Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

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BELFAST.

INTERNATIONAL EXHIBITION,

1862. CLASS X.

PRIZE MEDAL

For excellence of Fire-Clay Gas Retorts, and "HONOURABLE MENTION" for good quality of Fire-Bricks.

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MANUFACTURERS OF

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AMBLECOTE FIRE CLAY AND BRICK WORKS,
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Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.

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HANCOCK'S INDIA-RUBBER GAS-TUBING.

All sizes, from ¼ in. to 4 in. diameter and upwards.

Also,

HORSE SINGEING APPARATUS, best make, with GAS-BURNERS, COMBS, and INDIA-RUBBER TUBING, all complete.

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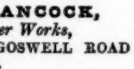
FLANGE TUBING, for excluding Draughts and Dust through WINDOWS, DOORS, and GLASS CASES.



Section.

Illustrated Price Lists on application.

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(for the last 10 years Engineer to the Corporation of Halifax), may be consulted upon all matters connected with the construction of gas-works, and the manufacture and supply of gas; also upon the construction of water-works and the supply of water to towns; and also in respect to the sewerage of towns, and sanitary works generally.

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ALFRED PENNY, Gas and
CONSULTING ENGINEER,

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Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

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SOCKET, FLANGE, HOT-WATER PIPES, AND ALL CONNEXIONS; RETORTS, HYDRAULIC MAIN, LAMP-COLUMNS, &c.; AND EVERY DESCRIPTION OF CASTINGS AND WROUGHT-IRON-WORK FOR GAS AND WATER-WORKS, STEAM, AND GENERAL PURPOSES.

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J. SUGG and CO., late ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

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ADDISON POTTER,
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NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

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Also,

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For Gas, Steam, Water, and other purposes.

GAS APPARATUS OF EVERY DESCRIPTION.

High-pressure Water-Valves and Cocks, &c., &c.

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STATION-METERS ANY SIZE.

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GAS-RETORTS always in stock.

GARDEN EDGINGS of various patterns.

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Contracts entered into to set Retorts, erect Furnaces, &c.

Shipments on the shortest notice.

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DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

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The above sieves are used by the principal gas companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from gas engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

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Of any extent at Home and Abroad,

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PIPES, VALVES, IRON ROOFS,

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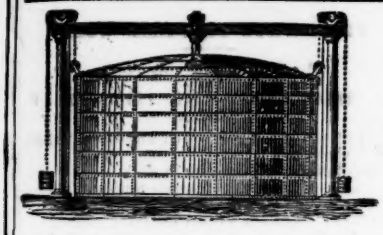

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INVENTED AND MANUFACTURED BY

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WILL BE SENT ON APPLICATION:—

PLANS, SPECIFICATIONS, and PRICES of GAS APPARATUS;

PLANS, SPECIFICATIONS, and ESTIMATES of the requisite BUILDINGS for each size of Apparatus;

PLANS of the IMPROVED ANNULAR CONDENSERS;

PLANS of the COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

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is removed to his New Factory,

VINCENT WORKS, VINCENT STREET,

REGENT STREET, WESTMINSTER.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

KING BROTHERS,

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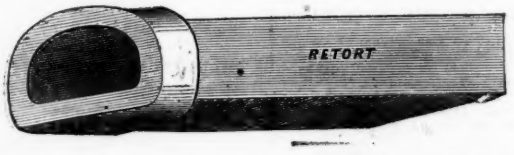

KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

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Every Retort and Brick is branded "King Brothers, Stourbridge.'

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AND MANUFACTURERS OF

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EVERY DESCRIPTION OF GAS-FITTINGS.

WORKS:

LONDON, BIRMINGHAM, & PARIS.

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Beg most respectfully to inform Gas Companies and the Trade that their

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Special Designs prepared in perfect accordance with architectural arrangements. Estimates furnished for the Lighting and Fitting up of Theatres, Music-Halls, and Public or Private Buildings with Gas.

GAS MOONS of the Newest Designs.

THE PATENT GAS-REGULATOR & PURIFIER

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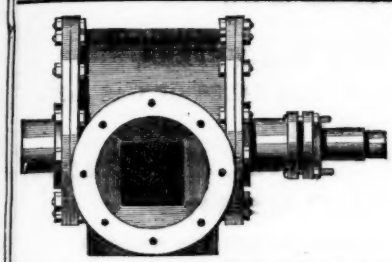

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RETORT SETTINGS, heated by tar without the production of smoke.
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FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS in which the Gasholder cannot tilt and cause accidents.

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MANUFACTURERS OF ALL DESCRIPTIONS OF

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Principally in Glass, working daily.

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Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

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Employed by the best experimenters in this country and on the Continent, and by the Gas Testers in the London districts.

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